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THE GROWTH CENTER STRATEGY IN THE
SOUTHERN OKLAHOMA DEVELOPMENT
ASSOCIATION'S DEVELOPMENT

By

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TABLE OF CONTENTS

Chapter	Page
I. NATURE OF THE PROBLEM	1
Introduction	1
Purpose of the Study	4
The Organization of the Study	5
II. GROWTH POLE THEORY: EVOLUTION, UNSETTLED ISSUES, AND APPLICATION	7
Evolution of Growth Pole Theory	7
Three Dimensional Space is Illusionary	8
Economic Space Parallels Topological Space	9
Schumpeterian Innovation Drives Economic Growth	10
Perroux's Meaning of Polarized Growth in Economic Space	11
Boudeville Links Polarized Economic Activity with Geographic Location	12
Selected Unsettled Issues in Growth Pole Theory and Growth Center Policy	13
Growth Pole Theory Raises Empirical Issues	14
Growth Center Policy Raises Contradictions	16
Does an Optimum Growth Center Size Exist?	19
Application of Growth Center Policy in the United States	27
Three Durable Program Tools	30
Demise of the ARA	32
The EDA Builds on Past Experience	34
Implementation of the Growth Center Strategy	37
Summary	38
III. POST WORLD WAR II REGIONAL RESOURCE DIMENSIONS	41
A Regional Relative to National Approach	41
Recent Regional Resource Trends	43
Synopsis	43
Human Resource Measures	45
Natural Resource Measures	65
Summary	83
Endnotes	85

Chapter	Page
IV. THE GROWTH CENTER STRATEGY IN SODA: AN EVALUATION	87
A Growth Center Strategy Has Been Followed	87
Positive Action Program Review	88
Descriptive Statistical Analysis of Funded Projects	94
Annotated Catalog of EDA Projects in SODA	99
EDA Growth Center Projects	102
EDA Noncenter Projects	131
Direct Effects of Evaluated Firms	138
Survey Design	138
Measuring Opportunity	140
Effects on Employees of Evaluated Firms	141
Effects on Formerly Disadvantaged Employees	168
Temporal Comparison of GC, RA, and National Wages	174
Summary	177
Endnotes	180
V. MULTIPLIER EFFECTS OF EVALUATED FIRMS	182
Comments on Conventional Wisdoms	182
An Input-Output Approach	184
Income and Employment Impact of Evaluated Firms	189
Summary	195
Endnotes	197
VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	198
Summary and Conclusions	198
Recommendations	203
A SELECTED BIBLIOGRAPHY	206
APPENDIX A - EMPLOYEE QUESTIONNAIRE AND RELATED DOCUMENTS	213
APPENDIX B - FUNDED PROJECT EVALUATION QUESTIONNAIRE AND RELATED DOCUMENTS	229
APPENDIX C - ACCURACY OF THE DATA	236

LIST OF TABLES

Table	Page
I. Indices of Infrastructure Cost	20
II. Educational Attainment by Persons Twenty- Five Years of Age & Over	46
III. Unemployment Rates (SODA vs. United States)	51
IV. Employment and Relative Shift in Employment by Major Industrial Sector, SODA Region (1940, 1950, 1960, 1970)	56
V. Postwar SODA Farm Characteristics	68
VI. Relative Importance of Major SODA Industrial Sector Employment	70
VII. Absolute and Relative Importance of SODA Agriculture Product	71
VIII. Indexes of Prices Received by Oklahoma Farmers for Agricultural Products (1910-14 = 100)	73
IX. SODA Crop Production	74
X. SODA Manmade Lakes	75
XI. Value of Minerals Produced in SODA (By Counties, Dollar Amounts in Thousands)	77
XII. Petroleum and Natural Gas Production, SODA and United States (1955-1976)	79
XIII. Wells Completed, SODA & State	80
XIV. Mining Employment Relative to Total Regional Employment	81
XV. Relative Covered Employment By Major Industry for SODA Counties	82
XVI. Completed Public Works and Business Loan Projects, SODA Region	95

Table	Page
XVII. Proportion of Completed Projects Located in Growth Centers	97
XVIII. Per Capita Comparison of Project Costs: Growth Centers vs. Noncenter Counties	100
XIX. Summary of Descriptive Statistical Analysis of Funded Projects	101
XX. Completed Job-Creating Firms Locating on Ada EDA-Sponsored Projects	104
XXI. Ada Jobs Attributed to EDA Projects in 1970 and 1977 . . .	113
XXII. Ardmore Airpark Employers and Employment	117
XXIII. Ardmore Industrial Airpark Commuting Labor Survey Comparison 1973-1976	119
XXIV. Completed Job-Creating Firms Located Along Arkansas (West of Ninth Street)	122
XXV. Completed Job-Creating Private Firms Located at Eaker Airport	130
XXVI. Durant Jobs Attributed to EDA Projects in 1970 and 1977 .	132
XXVII. Job Impact of EDA Catalyzed Job-Creating Projects	137
XXVIII. Scale for Identifying Poor Households	142
XXIX. Residency of Evaluated Project Employees	159
XXX. Percentage Distribution of Resident GC Employees by Location of Residency and Migrant GC Employees by Former Residency	162
XXXI. Summary of Comparable (?) Commuting Trends	166
XXXII. Percentage Distribution of Employee Commuting Distances: Olsen & Kuehn's Ozarks vs. SODA	167
XXXIII. Comparative Statistics: Effects of Job Development on Poverty Status	170
XXXIV. Selected Socioeconomic Characteristics of Employees Distributed by Skill Indicator of Present Job	172
XXXV. Output, Income, and Employment Multipliers: Planning District 4 (SODA)	188

Table	Page
XXXVI. Direct Input-Output Linkages of Evaluated Firms with SODA Economy (Dollar Amounts in Thousands)	191
XXXVII. Residency of Evaluated Firm Employees	193
XXXVIII. Geo-Specific Total Employment Impact of Evaluated Firms	194
XXXIX. Standard Error of Proportion for the Percentage Distribution of Resident GC Employees by Location of Residency and Migrant GC Employees by Former Residency	246
XL. Standard Error of Means and Proportions for Commuting Trends	247
XLI. Standard Error of Proportions for Comparative Statistics: Effects of Job Development on Poverty Status	248
XLII. Standard Error of Proportion for Selected Socioeconomic Characteristics of Employees	249

LIST OF FIGURES

Figure	Page
1. Oklahoma Planning Region IV (SODA) and the Ozarks Region . . .	3
2. Indices of Infrastructure Cost	22
3. Per Capita Costs of Providing Community Services by City Size	23
4. The SODA District, Growth Centers, and Redevelopment Area Counties	36
5. Distribution of Individuals by Age Class, SODA Relative to Nation (1950, 1960, 1970)	48
6. Distribution of Individuals by Age Class, SODA Region, 1970 .	50
7. Distribution of Families by Money Income Class: SODA Relative to Nation (1950, 1960, 1970)	53
8. Net Migration Rates for SODA Counties (1950-1960, 1960-1970) .	63
9. Location of Ada Firms	105
10. Airpark Access Road	115
11. Durant Arkansas Street Firms	123
12. Average Weekly Wages of U I Covered Workers as a Percentage of U.S. Average	176

NOMENCLATURE

AIDC	Ada Industrial Development Corporation
ARA	Area Redevelopment Administration
BLS	Bureau of Labor Statistics
CPI	Consumer Price Index
D.W.	Durbin Watson test statistic
DOT	Dictionary of Occupational Title Code
EA	Ethan Allen
EDA	Economic Development Administration
EDD	Economic Development District
EOC	Economic overhead capital
EPA	Environmental Protection Administration
FWPCA	Federal Water Policy Control Administration
FWQA	Federal Water Quality Administration
GC	Growth center
GED	General educational development
I-O	Input-output
MEDO	Manual of Economic Development Orders
NBER	National Bureau of Economic Research
NRPB	National Resources Planning Board
OEDP	Overall Economic Development Plans
OEO	Office of Economic Opportunity
OGA	Occupational Group Arrangement

QJT	On-the-job training
O&K	Olsen and Kuehn
ORC	Ozarks Regional Commission
OSIRIS	Organized Set of Integrated Routines for Investigations with Statistics
PAP	Positive Action Program
PWEDA	The Public Works and Economic Development Act of 1965 (PL 89-136)
R	Respondent
RA	Redevelopment Area
RC	Response Card
RC&D	Resource Conservation and Development
RMWRD	Real minimum wage rate difference
RWRD	Real wage rate difference
SEE	Standard error of estimate
SGC	Spontaneous growth center
SIC	Standard Industrial Classification Code
SMSA	Standard Metropolitan Statistical Area
SOC	Social overhead capital
SODA	The Southern Oklahoma Development Association
TA	Technical assistance
TVA	Tennessee Valley Authority
UI	The Federal Unemployment Insurance Tax Act
USEM	U. S. Electrical Motors
WTA	Worker Trait Arrangement

CHAPTER I

NATURE OF THE PROBLEM

Introduction

Socioeconomic inequality exists between rural and urban areas in this Nation. President Richard Nixon (70, p. 245) emphasized its seriousness in his first State of the Union message saying that, "Vast areas of rural America have been emptied of people and promise, while our central cities have become the most conspicuous area of failure in American life." The issue of rural-urban imbalance has been long recognized by concerned citizens in the United States and other parts of the world. Policies to alleviate economic distress in American rural and urban areas pre-date the New Deal and are in effect today.

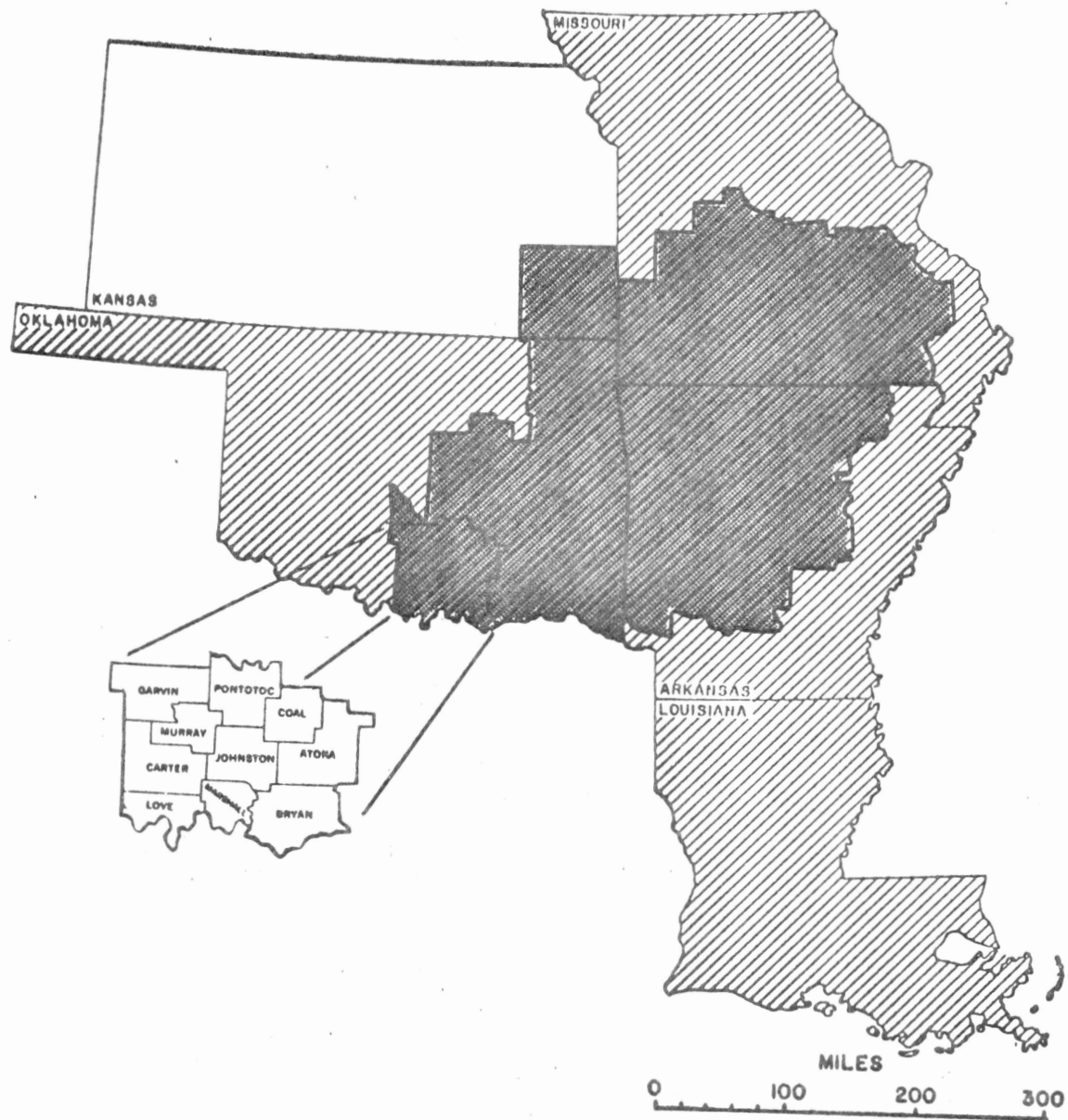
This study analyzes the application of the growth center strategy found in Title IV, Part B of the Public Works and Economic Development Act of 1965 (PWEDA, PL 89-136). Detailed analysis of PWEDA (Title IV, Part B) is developed in Chapter II; however, the basic idea is simply stated: concentrate limited federal rural development dollars in those communities with a potential for development that will spread to depressed rural areas. The strategy is intended to stimulate job opportunities in growth centers that are attractive to unemployed and underemployed growth center and rural residents. By creating job opportunities in growth centers, close to the depressed areas, impoverished rural residents can either commute or migrate to their growth center jobs. In

either case, impoverished residents would be encouraged to stay near their home. Thus, the rural to urban migration flow would be reduced, and attendant problems for both migrants and recipient areas avoided.

This policy is, however, controversial. For example, theoreticians cannot agree on specific characteristics a growth center must possess. Moreover, this policy is unlikely to be favored by at least two special interest groups: representatives of cities ineligible for growth center designation because their populations are too large, and representatives of small communities ineligible for growth center status because policy-makers decided they were too small to offer growth potential. In fact, one recently completed study of the Economic Development Administration's (EDA) growth center strategy claims that the growth centers that have been designated are not doing the job for which they were intended (40) (80) (83). Although valid research issues exist with respect to all of these issues, it is important to examine, at regular intervals, whether the existing growth centers are achieving their desired objectives. This is, in fact, the main objective of the earlier study (40) (80) (83).

The contention herein is that the earlier study was prematurely conducted. Therefore, this study analyzes the growth center (GC) strategy as applied to one Economic Development District: The Southern Oklahoma Development Association district (SODA) located in south central Oklahoma (Figure 1).

This particular development district is of interest for several reasons. First, all three of its growth centers were studied in the earlier EDA project. Second, SODA's growth centers were among the first designated. Therefore, the projects completed therein will have had as much time as is possible to take effect. Third, a lifelong residency by this



Source: Personal correspondence with Sanders Mitchell, Oklahoma Liaison Officer, The Ozarks Regional Commission.

Figure 1. Oklahoma Planning Region IV (SODA) and the Ozarks Region-- Darker shaded area represents original Ozarks Region and lighter areas represent new areas added in August, 1972.

researcher in the SODA district provides him with more familiarity with the problems the various funded projects were designed to overcome than possessed by members of the earlier research team. In several instances new facts emerged strong enough to warrant questioning the earlier researcher's conclusions. The survey methodology used to obtain data for the analysis in Chapter Four is extremely labor intensive and time consuming. Therefore, the limited resources at this researcher's disposal have permitted an exhaustive study only of one district, SODA.

Purpose of the Study

The main purpose of this study is to reexamine the results of the earlier study. Shortcomings and changes will be pointed out. Five additional objectives are:

1. To review literature leading to the evolution of the concepts of polarized growth and growth centers,
2. To present a concise socioeconomic description of Oklahoma Planning Region IV (SODA),
3. To examine Positive Action Program (PAP) documents and EDA-funded project statistics for evidence that a growth center strategy has been followed in SODA,
4. To calculate income and employment impacts of permanent jobs generated by firms whose SODA location is attributable to EDA-funded projects,
5. To provide an assessment of EDA policies designed to alleviate economic distress in SODA and to provide recommendations for further efforts.

The Organization of the Study

The next chapter highlights the evolution of the theory of polarized growth. Selected theoretical problems, which complicate the implementation of growth pole theory, are then discussed. A controversial side issue is the optimal size community to be selected for growth center designation. Research on this issue is reviewed as an example of the ambiguous nature of growth pole issues. A review of United States depressed area legislation and the implementation of the growth center strategy in SODA concludes the chapter.

Chapter Three is a socioeconomic description of the SODA district, the geographic setting of the study. The statistics reveal long-term trends typical of lagging rural regions. This economic distress was an important reason the district organized to take advantage of aid offered through PWEDA.

Chapter Four examines PAP documents whose preparation by GC leaders was made a prerequisite to the consideration of GC project proposals. Several descriptive statistics reflecting the funding of EDA projects in SODA are then examined. The conclusion is reached from this evidence that a pragmatic growth center policy has been followed in SODA. A review of completed EDA-funded projects in SODA (with emphasis on permanent job creation) then ensues. This review is built on definitions used in Milkman's 1970 SODA evaluation so that his critical conclusions may be reassessed (40)(80)(83). The analysis then turns to the results of a ten percent stratified random sample of the employees of nine SODA firms located in Ada, Durant, and Atoka. Inferences are drawn from the sample data about the firms' employees with respect to direct wage and earning

effects, migration effects, commuting effects, and direct effects on disadvantaged employees.

Chapter Five calculates total (direct, indirect, and induced) income and employment impacts of the ten SODA firms (the nine allowing employee sampling plus an additional firm not permitting employee participation) using multipliers derived from an input-output model recently estimated for the SODA district. The purpose of these calculations is to highlight the significant secondary effects that the firms are having on the district economy and to utilize in these calculations a valuable tool that, although available for several years, has received little use by district planners.

Chapter Six summarizes this study highlighting SODA's first decade as an Economic Development District operating under EDA guidelines. Recommendations for policy changes and further research on district problems are made.

CHAPTER II

GROWTH POLE THEORY: EVOLUTION, UNSETTLED ISSUES, AND APPLICATION

This chapter has three objectives. First, key concepts of growth pole theory are set forth. Second, a sample of unsettled issues demonstrates that Francois Perroux's appealing process of polarized growth lacks theoretical perfection. Finally, a review of the origins of United States depressed area legislation indicates that the unsettled issues have not prevented application of growth center policy. Thus, the purpose of this chapter is to provide the reader with an introduction to the implementation of growth pole theory.

Evolution of Growth Pole Theory

Although many have written about growth poles and growth centers, only a few key concepts are needed to trace the evolution of the theory. Francois Perroux (54) is the father of the growth pole idea. Contemporary theory and policy has evolved from his concept of abstract economic space developed in the article, "Economic Space: Theory and Applications," in which he stated space is not only three dimensional, but multidimensional and that economic space is analogous to topological space in its mathematical sense. His process of polarized growth embodies the combination of the concept of a pole as a vector of forces with Schumpeterian innovation. However, not until 1961 did Jacque

Boudeville, a follower of Perroux, make the critical link between economic and geographic space. The evolutionary sequence is explained more fully in the following subsections.

Three Dimensional Space is Illusionary

Perroux thinks that viewing space as exclusively three dimensional creates the illusion that man is a boxed-in material object. He thinks this illusion derives from two observations residents of small European nations were making: first, that large nations possessed abundant economic resources relative to the meager ones of small nations and second, that they were boxed in a small three dimensional container--the political boundaries of their nation. From these realistic observations they developed the notion that the "small country is condemned to impotence, dependence and exploitation" (54, p. 89). Thus, they blamed the small size of their nations, relative to others in three dimensional space, for their economic woes. Additionally, political leaders found this prevalent idea a convenient scapegoat. They promoted the notion that small national size is responsible for economic problems, thus permitting them to divert attention from their own mistakes.

Perroux (54, p. 90) thought the notion that the "relations between different nations consist exclusively in men and things as material objects contained in a container" to be contradicted by evidence in the contemporary world. He thought the world economy more than a simple aggregation of national economies, each defined by its own political boundary. Rather a nation's geographical space, demarcated by its political boundaries, is but one of many overlapping and interrelated spaces. The mathematical concept of abstract space extended to economic

science is all that is needed to dispel the illusion that small size is the cause of small nation impotence.

Economic Space Parallels

Topological Space

Mathematicians distinguish between Euclidean space and abstract topological spaces which are comprised of multidimensional structures of abstract relations:

By pure and simple transposition of this distinction between Euclidean and abstract space, we may distinguish in our discipline as many economic spaces as there are constituent structures of abstract relations which define each object of economic science (54, p. 91).

Thus, economic activity transcends the boundaries of three dimensional space. Utilizing this analogy, Perroux (54) distinguishes three types of economic space:

1. Plan-defined economic space consisting of,
 - the structure of relations defining the plan of the economic entity and also the plans of other economic entities with which it is associated (p. 91).
2. Economic space as a force-field,
 - consisting of centers from which centrifugal forces emanate and to which centripetal forces are attracted. Each center being a center of attraction and repulsion, has its proper field, which is set in the fields of other centers (p. 95).
3. Economic space as a field of homogeneous objects where,
 - each economic entity has, or has not a structure more or less homogeneous with those of other entities which are its neighbors topographically or economically (p. 96).

For example, a firm may be thought of as a focus releasing centrifugal forces into its economic space, such as those associated with the sale of its output, or centripetal forces, such as those that attract

personnel and materials to it. Economic space conceived of as a field of forces is important to this study because it leads to the idea that geographical space is polarized, to the notion of development poles to the birth of the growth center concept.

Schumpeterian Innovation Drives

Economic Growth

Joseph Schumpeter (63) hypothesized that economic evolution results from innovations that are generated by individuals with particular talent, vision, and daring. Imitators then keep an evolutionary wave going by copying innovational changes. However, they reap less economic gain from any innovation than its innovator because they are neither as able nor are they the first to try any particular innovation. Over-expansion by imitators eventually leads to an economic correction, which eliminates marginal firms and forces others to adopt cost-reducing innovation in order to survive. Schumpeter developed his theory to explain business cycles as a result of the introduction, adoption, and eventual saturation of the economy by innovations.

Perroux postulated that innovation, in a Schumpeterian sense, is the driving force behind economic growth. Over time, innovation in old or new products and processes leads to the growth of existing industrial sectors and to the development of new ones. The growth of industrial sectors results in the growth of sectors linked to them as suppliers of inputs and to the growth of sectors which they in turn supply. Cumulative growth results from direct and indirect innovational impacts. Although Schumpeter (63, pp. 100-102) noted that innovations neither appear regularly nor spread evenly, Perroux (55, p. 310) extends the

Schumpeterian process when he proclaims that growth "shows itself in points or poles de croissance, with variable intensities; it spreads by different channels and with variable final effects for the economy as a whole." Thus Perroux's pole is a derivative of his concept of economic space as a force-field. What, however, is the meaning of Perroux's poles de croissance?

Perroux's Meaning of Polarized
Growth in Economic Space

Consistent interpretation between growth pole theorists is difficult because of semantic confusion. A good example occurs in the use of the word pole and its derivatives (19) (24) (34).

The contemporary meaning of pole is given in Webster's Dictionary (87) as, "either of two opposed forces, parts." An alternative definition is "a long stick of wood, metal, etc." However, J. R. Lausen (34, p. 159) suggests the term pole, as it is used in modern languages, combines the meanings of the Latin root words "palus" (stake) and "polus" (axis). Palus conveys the image of the word "vector," which Webster (87, p. 281) defines as "A quantity, such as a force, having direction and magnitude." Polus conveys the image of opposing poles generating forces which attract or repulse elements between them.

Perroux uses pole in its "palus" sense. Perroux's growth pole is a vector of economic forces, one of whose elements is the force of growing industrial sectors. The semantic confusion arises because Perroux uses a current word in a relatively unknown sense. This study refers to polarization in accord with Perroux's usage. Although a pole intuitively would appear to exist in a geographic sense, Perroux's theory, as

reviewed up to this point, has not directly linked activity in economic space with activity in Euclidean space.

Boudeville Links Polarized Economic
Activity with Geographic Location

Perroux's (54) original discussion and application of economic space theory does not emphasize the possible connection between the polarized growth process envisioned and development of a localized geographic area. He seems to have intentionally omitted a discussion of this connection. Perroux's theory is an optimistic one offering encouragement to the residents of small nations that the small geographic size of their nation does not doom them and their country to economic dependence and exploitation. He omits the link between geographic space and the other economic spaces in order to emphasize the point that geographic size need not doom a small nation, because forces in other spaces provide as powerful development forces as those derived from large geographic size.

Jacque Boudeville (11, p. 2), a follower of Perroux, makes the first major effort to join economic space with geographic space. He insists that abstract economic space theory "is the application of mathematical space on or in a geographic space." He also thinks three types of economic space exist, but adds a geographic orientation which is not contained in Perroux's (supra, p. 9) original definitions:

1. A planning region is a continuous area localized in geographic space, formed for the purpose of carrying out plans of some authority to attain economic goals.

2. A polarized region is also a continuous area localized in geographic space, but its parts are interdependent and exchange relations

with a dominant regional center of gravity (pole) are greater than with neighboring regions.

3. A homogeneous region is a continuous geographic space whose characteristics within are more nearly alike than between it and the characteristics of other regions.

Likewise, Boudeville's (12, p. 11) conception of a growth pole is geographically oriented; in Problems of Regional Economic Planning, he first claims that, "A regional growth pole is a set of expanding industries located in an urban area and inducing further development of economic activity throughout its zone of influence." Farther along he explains himself more fully:

It would be preferable to describe poles as geographical agglomerations of activities rather than as a complex system of sectors different from the national matrix. In short growth poles will appear as towns possessing a complex of propulsive industries (p. 112).

Because of his explicit introduction of geographic considerations into Perroux's theory, Boudeville (29) bridges the gap between abstract space and geographical space.

Selected Unsettled Issues in Growth Pole

Theory and Growth Center Policy

Synoptic reviews of growth pole theory and growth center policy, such as Allen (1), Cameron (15), Hermansen (29), and Lausen (34), bring out elements of three theories: (a) growth pole theory, (b) central place theory, and (c) innovation theory. However, the exact inter-relationship between them is ill-defined. Thus, the reviews raise more theoretical questions than they answer.

Growth Pole Theory Raises

Empirical Issues

Even a partial review of unanswered questions reveals the scope of issues raised in conjunction with growth pole theory. Thomas (75, p. 58 and p. 71) claims we need to know why, how, and where growth poles grow, what the spatial dimensions of growth poles with surrounding hinterlands are, and what the pattern of industry, firm, and sector growth is within a pole and over time. Tolosa (76, p. 222) additionally calls for emphasis on the influence of time on the distribution of poles. Hermansen (29, p. 65) echoes Thomas to a great extent, but calls for greater emphasis on the relation between growth pole theory and central place theory. Hermansen and Thomas, moreover, plea for research on the relation between polarized development and innovation diffusion. Thomas, for example, wants the rate and nature of innovation adoption intrafirm, interfirm, and interpole studied.

Thomas (75, p. 58) considers another set of concepts that need examination under the heading of cost reduction. He wonders, for example, whether agglomeration economies, which reflect cost reductions stemming from the collocation of economic activity, are significant at growth poles. Thomas' cost reduction topics also encompass internal economies of scale and economies of innovation. For example, do lower costs per unit of output and/or per unit of research occur in larger plants? However, Darwent (19, p. 23) cautions that few even agree on an operational definition of agglomeration economies.

Nevertheless, the concept of a polarized growth process has intuitive appeal for regional policymakers. They can easily understand the potential benefits to a depressed region of combining the economic field

of forces associated with an innovative industry with the field of economic forces already existing at a geographic location. If the impetus is strong enough and continued long enough, the sector (of which the industry is a member) and the geographic location (at which the industry is located) might grow. As Lausen (34, p. 139) explains, "Around the industries and their location, sectorally and geographically, the activities linked to the leading ones grow faster than their counterparts elsewhere."

The appearance can even be given that agreement exists between theorists as to the characteristics propulsive firms should possess. For example, Hermansen (29, p. 169) writes of both propulsive firms (industries) and key ones. He thinks that a propulsive firm or industry is relatively large, utilizes advanced technology, is highly innovative, and exerts a large influence on its environment through interindustry linkages. Hermansen's key firm or industry must be even more innovative and propulsive. Additionally, its products should face a highly income-elastic demand curve, a requirement recognizing that long-term prospects are brightest in those firms and industries whose demand grows relatively faster than the income levels of the consumers of its product. Finally, he believes the firm or industry should belong to a fast-growing sector of the economy.

Similar to those listed by Hermansen, Niles Hansen (24) feels the propulsive firm (industry) should possess three characteristics:

First, it must be relatively large in order to assure that it will generate sufficient direct and potentially indirect effects to have a significant impact on the economy; second, it must belong to a relatively fast-growing sector; and third, the quality and intensity of its interrelations with other sectors should be important so that a large number of induced effects will in fact be transmitted (p. 717).

Jean Paelinck (52), however, warns that the application of growth pole theory in geographic space is incomplete. He calls growth pole theory a conditional theory of regional growth because it establishes the conditions under which regional growth may occur at accelerated rates, but does not establish conditions predicting the geographic location of a pole.

Growth Center Policy Raises

Contradictions

Growth center policy is seemingly an attempt to implement growth pole theory in spite of its unsettled theoretical foundation. Nations implementing a growth center policy usually do so by designating central places as sources of concentrated development efforts. France, Canada, West Germany, Norway, Sweden, and the United States are a few nations that have attempted or have at least recognized merit in the growth center philosophy. Nevertheless, a growth center policy raises contradictions in addition to those raised by growth pole theory.

Potential expansion of hinterland resident incomes is an alleged positive feature of growth center policy. Cameron (15, p. 46) and Thomas (75, p. 59), for instance, believe that concentrating development in a center will enhance incomes of hinterland residents more so than giving income directly to them. The skeptical Darwent (19, p. 13), however, cautions, "empirical demonstration of inducement effects is not satisfactory."

The pattern of human migration forms the core of another growth center controversy. An early European Free Trade Association study (57, p. 64) suggests that migration follows a hierarchial pattern. That is,

people prefer to move to job opportunities located in communities higher in the same central place system rather than to places in other systems. If this unsupported assertion is true, it augurs favorably for growth center policy. Creation of job opportunities within growth centers is an integral part of the strategy. By choosing as centers communities below those in the highest hierarchial level of a central place system, the migration flow might be turned from this level (presumably containing the largest cities) to smaller communities with a lower loss of satisfaction on the part of migrants. However, Cameron (15, p. 54) argues that the unemployed will not migrate to regional centers even if job opportunities are there, because they are tied to their present locations by friends, relatives, property holdings, or for psychological reasons. Therefore, the empirical pattern of human migration responding to created jobs becomes an important issue.

An implicit assumption of the growth center philosophy, according to Cameron (15, p. 40), is that unit infrastructure costs fall as growth center size increases. There is also evidence to indicate that unit infrastructure costs may eventually increase with increases in growth center size. Thus, some city size in between must minimize these unit costs.

Niles Hansen (26)(27) is critical of the EDA's strategy of concentrating the use of program tools in small centers. He prefers to concentrate development efforts in intermediate-sized cities and to encourage residents of smaller lagging areas to migrate to them. Hansen's (25, p. 279) review of research studying the optimum city size issue leads him to believe that the term "minimum" is more useful than "optimum" when used in conjunction with the per capita costs of services. Hansen

believes that the minimum-sized city able to provide the range of services needed by people and firms is in the neighborhood of 250,000 population or above.

Harry W. Richardson (58, p. 35) also believes that "a minimum threshold size for a city may be more sensible than an optimal size." After reviewing many of the same studies that Hansen does, he concludes that much of the evidence

. . . supports the view that 200,000 to 250,000 is a minimum city population for providing a comprehensive range of services. . . . [but] This is not to deny that for many services a population of 30,000, 50,000, or 100,000 may be sufficient (58, p. 35).

Luther Tweeten (77, p. 845) also suggests that the city size issue has bearing on the provision of both public and private goods and services; he concludes that "a given quality of community services can be provided most efficiently in cities of 20,000 to 1 million residents." With respect to the question of city size and private firm profitability, Tweeten (77, p. 845) asserts that "Preliminary results indicate that profit rates within a given industry do not differ significantly by city size."

The notion that communities should be a minimum size before they qualify as growth centers is a frequently raised point of controversy and is an issue particularly pertinent to SODA. The July, 1974, estimated populations (44) of the three SODA growth centers are: Ada (16,900), Ardmore (23,500) and Durant (11,600). Thus, the population size of two SODA growth centers is below Tweeten's lower size limit. If policy makers become convinced that Hansen's view is valid and consequently revise legislation, growth centers the size of SODA's would probably no longer receive preferential treatment. However, no consensus has been

reached about what the minimum size should be, as the following review demonstrates.

Does an Optimum Growth Center
Size Exist?

Is there a growth center size that is optimal in some sense? A myopic definition of an optimum might be, for example, the city population level minimizing per capita costs of city services. This notion is somewhat similar to the economic concept of scale economies.

Conceptually, as a result of economies of scale, long run per unit costs decline, reach a minimum, and then rise as plant size increases. In the same sense, city operating costs might reflect economies of scale as the city acquires a minimum cost infrastructure mix. Empirical evidence reviewed in the ensuing discussion, although inconclusive, sheds light on the issue. Two studies are reviewed in depth and conclusions extracted from several others. The S.V.I.M.E.Z. (73) and Morris (41) studies illustrate some of the complexities involved. The remaining studies suggest that no single city size is optimal in the cost sense.

A Minimum Standards Approach. One empirical approach to this problem is based on the "standards" technique. The idea is to measure the per capita cost of providing a minimum amount of necessary infrastructure. An Italian study (73) of infrastructure costs reveals a broad range of population size classes within which per capita costs rise but very slightly. Table I summarizes this study.

When the per capita costs are indexed with the city size class 20,000-50,000 equal to 100, per capita costs are 27.7 percent higher

TABLE I
INDICES OF INFRASTRUCTURE COST

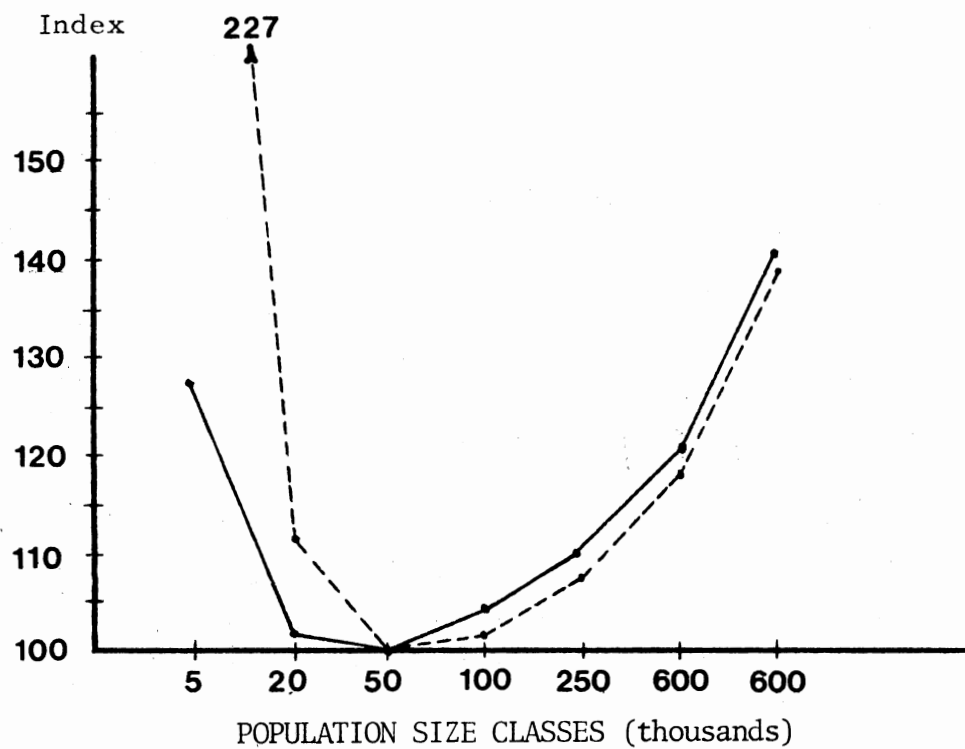
Population Size Class	Index 20,000-50,000 = 100 (excluding hos- pitals & high schools)	Index 20,000-50,000 = 100 (including hos- pitals & high schools)
up to 5000	127.7	227.0
5,000-20,000	101.5	112.5
20,000-50,000	100.0	100.0
50,000-100,000	104.7	102.0
100,000-250,000	110.5	108.0
250,000-600,000	120.4	118.0
600,000 & over	140.3	138.0

Source: K. Allen, "Growth Centers and Growth Center Policy," Regional Policy in the European Free Trade Association: An Examination of the Growth Center Idea. University of Glasgow: Social and Economic Studies, Occasional Paper Number ten. Edinburgh: Oliver and Boyd, 1968, p. 90.

for communities below 5,000 persons. The same per capita cost level is not approached again until the 250,000-600,000 size class is reached. However, these results have been criticized by both Cameron (15) and Allen (1) because the Italians assumed that per capita costs of hospitals and secondary schools did not vary with community size.

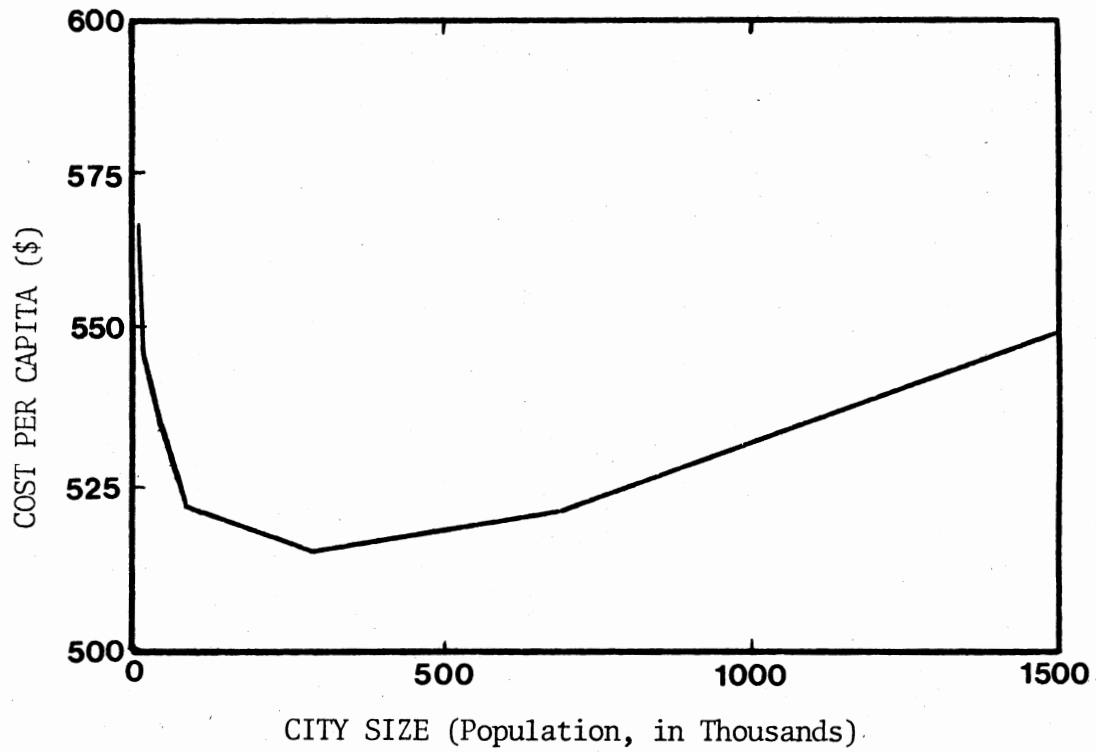
Allen attempted to modify the Italian study. He assumed that a hospital and senior high were provided in each community. Column three gives the recalculated index, again taking the 20,000-50,000 group of cities as 100. As can be seen in the plot of both indices (Figure 2), the series including the hospitals and schools falls much more steeply in the size categories below 50,000 than the unmodified series and is flatter than the unmodified series for categories above. Allen and Cameron (15, p. 42) both conclude, "the figures suggest that the infrastructure cost curve conforms to the typical U-shaped distribution, with the minimum cost range lying between communities of 30,000 and 250,000 population."

An Aggregation Approach. A recent study by Douglas Morris (41) tackles the economies of city size question head on. Morris asserts that the lowest segment of a per capita cost curve marks the smallest city size range that should be the focus of public policies to encourage growth, whereas the city size range showing the highest per capita cost might be discouraged from growing. In order to find the optimum city size range, Morris aggregates per capita cost curves for various community services into a per capita cost curve of providing community services by city size (Figure 3). He concludes that the optimal city size has a population of about 300,000.



Source: See Table I.

Figure 2. Indices of Infrastructure Cost--Solid line excludes costs of hospitals and high schools.



Source: Douglas Morris, Economics of City Size: Per Capita Costs of Providing Community Services, Unpublished PhD Dissertation, Agricultural Economics, Oklahoma State University, May, 1973, p. 111.

Figure 3. Per Capita Costs of Providing Community Services by City Size

Morris adds nine components together to find the aggregate curve. When the services are considered singly, before aggregation, some of the services studied exhibit both economies and diseconomies of city sizes over the range of sizes considered. Explicitly considered are police department expenditures, the per capita cost of obtaining quality air, the national mean cost of fire insurance, of general hospitalization, of primary and secondary education, and of providing electric service, sewage service, refuse collection, and public water service.

Mention of a few limitations in Morris' study, typical of efforts to estimate an optimal city size, should be illustrative. First, the optimum size is the one that existed in about 1970. Thus, Morris' (41, p. 116) study does not consider how the optimum city size changes over time. Second, the study considers the optimum size city for providing community services, yet several were omitted: employment bureau administration, postal, telephone, welfare administration, doctor, dental, local government administration, transportation, natural gas utility services, outdoor recreation, higher education, and cultural activities, for example. Probably no one study can consider all simultaneously. Third, the optimum-sized city is dependent on the kinds of services included in the cost estimates. For example, in an appendix, the transportation costs by city size are reported, and the optimal city size is determined with transportation costs composed of an "opportunity cost of time spent in transit plus the cost for transportation per se" (41, p. 128), included. The effect of combining transportation costs with the other per capita community service costs is to shift the optimum city size from 300,000 to 500,000. Thus, it seems that the optimum-sized

city is an illusive figure. A brief review of two other studies further reveals the inconclusive nature of optimum city size research.

Other Optimum City Size Investigations. Colin Clark (17) was an early investigator. He concluded, in his study seeking to analyze the ability of cities of various sizes to provide a desirable range of tertiary services, that a city of 150,000 could supply these needs adequately. Cameron (15, p. 43) cites a study of five Indian cities which reveals little variation in infrastructure cost over the range of city sizes studied, although generally costs of social infrastructure "fell irregularly but consistently from the 48,000 city level to 212,000, increased again for the 323,000 city, and thereafter remained constant." Thus, some scientific basis appears to exist for choosing as growth centers communities from a wide range of population sizes, rather than Hansen's larger "intermediate" sized communities only. Semantic confusion caused by using the term "growth center" in two senses may also be contributing to the indecision over the minimum size of a growth center.

Two Types of Growth Center. Induced growth centers are those in which deliberate efforts are being made through public policy measures to enhance growth. Spontaneous growth centers grow without deliberate public policy efforts. According to Collier (18), Perroux, Boudeville, Hirschman, and Hansen have developed their theory with the spontaneous growth center in mind. Hansen, for example, argues that a genuine growth center is an intermediate size city (in the 250,000 to 750,000 population range). Because growth acceleration in them will be easier than in lagging regions, they offer the opportunity for "the most

efficient use of public funds for development programs" (25, p. 279). Here Hansen appears to be talking about the spontaneous type, because in the same paragraph he admits that "such centers do not 'need' any government subsidy," presumably because their growth is already self-sustaining. Additional perspective on spontaneous growth centers is provided by Alonso and Medrick.

William Alonso and Elliott Medrick (2, p. 230) delineate spontaneous growth centers (SGCs) throughout the nation by comparing census figures with an operational definition of a SGC that arbitrarily sets as a minimum criterion "a rate of net in-migration twice that into the total set of Standard Metropolitan Statistical Areas (SMSAs) as defined in the 1960 census." The aim of this study is limited to describing the role of SGCs in the temporal urbanization of American society. The study covers the time period since the turn of the century (1900). During this period SGCs contributed 50 percent of all metropolitan growth, but SGCs in the smaller 50,000-250,000 size class contributed a declining share (2, p. 235). The smaller size class is of particular interest because SODA's central places are even smaller in size.

Alonso and Medrick found that SGCs of the smaller size class contributed a declining share primarily because the growth rates of smaller centers are highly variable over time. Small centers with a fast growth rate quickly grow out of the small class, while small ones exhibiting a discontinuous burst of growth quickly begin to lose ground in terms of absolute population and thus disappear as SGCs in the following decade. Thus, small-sized SGCs probably have a great local importance but little affect from a national standpoint. If they successfully retain the SGC

label, they tend to develop a staying power and outgrow the small size class (2, p. 238).

In conclusion, it should be noted that SGCs designated by Alonso and Medrick in the midwest exhibited a complete turnover between the 1950s and 1960s. Of the three close to SODA, Oklahoma City and Ft. Smith have been SGCs for only two discontinuous decades, while Dallas received a four-decade label (2, pp. 245-6). Generally though, Alonso and Medrick (2, p. 248) argue that American growth policy has been too restricted to "the question of induced growth centers in areas of retarded development," and they call for federal guidance in the development of a system of urban areas in keeping with national objectives. Rather than pursuing objectives of national population distribution planning, let us pause to examine the origins of legislation that led to the designation of SODA's three growth centers.

Application of Growth Center Policy in the United States

An exhaustive study of federal involvement in subnational problems could begin with land distribution legislation in the 1800s (42). Some of Roosevelt's New Deal Programs had regional overtones. For example, The National Resources Planning Board (NRPB), established with the passage of the National Industrial Recovery Act of 1933, recommended that improvement districts be set up with multicounty or multistate boundaries. The Tennessee Valley Authority (TVA) is another Roosevelt program that is regional in nature. However, these programs were not specifically designed to bring federal aid to economically depressed

subnational areas. Their emphasis was national full employment and on moving the unemployed to new jobs and new locations.

Interest in regional problems heightened as World War II drew to a close. Congress was concerned that the closing of war-related industries and facilities might create rising unemployment in their vicinity. Two bills were introduced reflecting these concerns. The Hays-Bailey bill was introduced in September, 1945. This bill, probably the first United States legislation dealing specifically with problems of underdeveloped areas, emphasized slowing rural emigration, bringing industry to rural areas, and raising rural incomes and standards of living. It is also notable because it represents a shift in policy emphasis from the New Deal philosophy of "people to jobs" to the current "jobs to people" philosophy. Although the Murray-Sparkman bill introduced in June, 1949, was primarily an economic expansion bill calling for national full employment, its Title V set forth tools useful in regional high unemployment areas. This title provided for federal technical assistance, collection of regional economic data, public works grants and loans, preferential loans to small business, federal procurement in depressed areas, and manpower training and relocation assistance. Many of these tools are currently in use, although neither bill was enacted.

Major legislative efforts in the United States to bring federal aid to economically depressed geographic areas are attributed to Senator Paul H. Douglas. "Douglas's contribution in the main was that he succeeded where others before him had failed" (42, p. 2-14). His efforts to construct special programs for rehabilitating depressed areas during the Eisenhower administration are well documented (35)(42). However, Eisenhower's basic position was that problems of economic adjustment in

subnational areas were the concern of local citizens. Federal efforts to aid the economy should be limited to macroeconomic policies aimed at assuring a high national level of employment and income.

Senator Douglas' interest in aiding depressed areas was kindled during his 1954 re-election campaign visits to economically depressed southern Illinois. His first depressed-area bill was introduced in the Eighty-fourth Congress (January, 1955), but the attempt died in the House Rules Committee. Douglas introduced another bill in the Eighty-fifth Congress (1957) and a depressed-area bill was finally passed, only to fall to Eisenhower's pocket veto after Congress adjourned. Several pieces of depressed-area legislation were introduced into the Eighty-sixth Congress (1959) because the 1958 recession heightened interest in employment-stimulating legislation. Included was a revamped version of the Douglas bill. However, the 1959 recovery dampened enthusiasm for stimulative legislation. Nevertheless, Congress finally passed Douglas' third effort, which also suffered a Presidential veto in May, 1960.

John F. Kennedy became interested in Douglas' bills while a Senator. His promise to give depressed area legislation top administrative priority was an effective campaign tool in the depressed textile area of his home state, Massachusetts, and in the depressed coal mining area of West Virginia. Additionally, Kennedy was exposed to other depressed areas of the nation during the presidential campaign. Immediately after his election, Kennedy appointed Senator Douglas chairman of a special task force to investigate problems of depressed areas. The report, recommending Douglas' program as the first step, was submitted to Kennedy before inauguration on New Year's Day; and Senate hearings were begun by Douglas two days before inauguration. The Douglas bill, very

similar to the one previously vetoed by Eisenhower, quickly cleared Congress. Douglas' only compromise was to give up his desire that an independent agency be formed to handle the depressed area problem in exchange for the Administration's wish to give administration of the new program to the Department of Commerce. On May 1, 1961, President Kennedy signed the Area Redevelopment Act (P.L. 87-27) and after almost six years of effort, the nation's first legislation specifically designed to treat problems of subnational depressed areas was launched.

Three Durable Program Tools

Three of the tools presently used to treat depressed areas were included in Douglas' original proposals as formalized in the Area Redevelopment Administration (ARA). According to Levitan (35, p. 45) "Underlying Douglas' approach was the assumption that there was inadequate venture capital in such areas for new or expanding industry." Thus credit for firms locating or expanding in depressed areas became a key program tool that manifests itself presently in the Economic Development Administration Business Loan Program. Controversy has, however, always surrounded credit provision facilities, with some individuals favoring federally guaranteed privately provided loans, and others favoring direct loans at lower-than-market interest rates. Additional controversy centers on the total amount of credit to be made available, loan duration, proper use of the funds, and the extent of federal participation. In practice, funds are usually supplied, from a combination of federal, state, and private sources, and are used to purchase land, equipment, and buildings. Frequently, the loan is made to a tax-exempt public trust or corporation which constructs and equips the manufacturing facility to the firm's

specifications, and then leases the whole facility back to the firm for 20 to 25 years. Provisions are usually made to purchase the facility for a nominal sum at the end of the term. Property taxes are thereby avoided for the lease's duration.

The second tool is the provision of federal funds to subsidize the construction of infrastructure in depressed areas. The Douglas view was that certain types of public facilities might never be constructed in depressed areas without federal aid. This view is manifest in the EDA Public Works Program. Controversy has also always surrounded this tool, with proponents arguing that private industry is attracted to communities able to offer good schools, amenities in the form of public facilities, and adequate public utilities. Opponents argue that adequate funds are available through other federal agencies, through the power of municipalities to issue tax-exempt community facility bonds, and that federal funding of infrastructure moves in the direction of federalizing municipal finance (35, p. 134). Douglas had a personal bias toward providing industrial water facilities as a first step toward industrial development of depressed communities; and, in fact, industrial water and sewer facilities are prevalent among EDA projects. He also favored projects promising to provide new permanent jobs; however, federal assistance is not limited to projects of this type. A preoccupation with counting the number of permanent jobs to be created nevertheless appears in project applications, and a penchant for counting jobs actually created is emphasized in evaluations (40).

A third program tool originating with Douglas' legislation and carrying through both the ARA and the EDA is the provision of technical assistance grants. These grants are intended to help communities

develop their own economic potential and are not restricted to use by depressed area applicants. During the first two years of ARA activities (through April, 1963), funds were committed to ARA program options as follows (35, p. 155):

Industrial and commercial loans	\$111 million
Public facilities loans and grants	82 million
Technical assistance	8 million
Training	<u>14 million</u>
Total	\$215 million

The relatively limited technical assistance (TA) commitment is only 4 percent of the total. In practice, TA grants have been used to pay for feasibility studies, management assistance, resource use studies, and project evaluation reports. One TA grant significant to SODA was the 1967 grant used to pay the Fantus Company to study the feasibility of locating warehouse facilities in the region. Because Fantus was aware of the area's features, it passed its recommendation on to Uniroyal, which subsequently built a 1600-employee radial tire manufacturing plant in Ardmore.

Demise of the ARA

Even this brief introduction to the legacies of the ARA, the organization that developed program tools in the extant EDA approach, reveals that ARA was born in a caldron of political compromise. Its legislative guidelines unfortunately were not tightly enough framed to prevent it from falling victim to the very forces creating it:

Congressional pressures to designate eligible areas and expend funds played havoc with any notions of planning entertained by program administrators . . . experience dictated policy. As each element requisite to project approval was isolated, a guideline was issued declaring an agency policy to require that element in future policy (40, p. 3).

After passage of the Act, political pressures mounted for the immediate selection of eligible areas. Since the ARA had no staff with which to draft selection criteria, the new agency was forced to call on other departments (particularly the Departments of Agriculture and Labor) to determine eligible areas (35, p. 64). Redevelopment areas were designated on a county-wide basis. Within eight months of the ARA's formation, about 1,000 counties were ruled eligible to receive funds, almost one-third of the counties in the United States. Moreover, the Secretary of Commerce required the ARA "to distribute the projects widely among the several states" (42, p. 2-23). The ARA's four-year appropriation was \$551.9 million, although actual obligations were only \$352.3 million. Thus, only about \$88,000 per county per year was distributed, assuming an equal distribution per county. Financial details of completed SODA public works projects are given in Table XVI (page 95). As can be seen, \$88,000 is a small amount compared with projects funded under the EDA. This evidence supports the criticism that the ARA seriously overextended its ability to contribute significantly to alleviating distress (40, p. 4).

Other problems beset the ARA. Early reports and news releases filed by an enthusiastic ARA staff predicted job creation and unemployment reduction that did not materialize. The lack of uniform project and area eligibility criteria brought cries of political motivation in project selection. The General Accounting Office accused the ARA of "Doctoring and inflating employment statistics to cast favorable light on its programs" (42, p. 2-24). Overall Economic Development Plans (OEDP) required of counties before they qualified for ARA financial assistance "were poorly conceived and failed to contain essential

economic data needed for future economic planning" (35, p. 197), because they were usually written by ad hoc groups of county leaders lacking planning expertise. In short, Milkman (40, p. 4) claims that the ARA's image "was tarnished by mistakes and unrealized expectations."

The EDA Builds on Past Experience

The Johnson administration submitted its message on area and regional development in March, 1965, and the Public Works and Economic Development Act (PWEDA) encompassing administration recommendations was signed into law in August, 1965. The new Act permitted the question of area eligibility to be considered anew. In addition to increased applications of the three ARA tools previously discussed, several new features of PWEDA are designed to overcome deficiencies of the ARA.

The clamor of one thousand counties claiming eligibility for ARA funds had proved an excessive burden on the ARA. Additionally, since most eligible areas lacked funds with which to hire planning staffs, OEDP preparation and planning was handled for most applicants for ARA funds by part-time volunteers. The result was inadequate long-range planning. Therefore, the new Act provides that multicounty Economic Development Districts (EDD) be formed to investigate economic development problems common to the whole district. A new category of grants is provided to hire full-time, nonfederal, planning staffs for the development districts. Although requirements for OEDPs are retained, they are to be prepared by the district staffs under the guidance of the citizens comprising the district's board of directors. Moreover, the OEDPs are to cover the district as a whole rather than to be a separate OEDP for each county. In order to minimize the chances that EDDs might

be designated too hastily, the Act provided a one-year grace period before district boundaries could be designated and project grants in them approved.

Since EDDs might be formed that did not contain a single depressed county, the Act specifies that eligible districts contain counties designated by EDA as Redevelopment Area counties (RAs). The RAs are supposedly the most economically depressed counties in the EDD. In the SODA district, for example, Johnston, Coal, and Atoka counties were originally designated RAs (Figure 4).

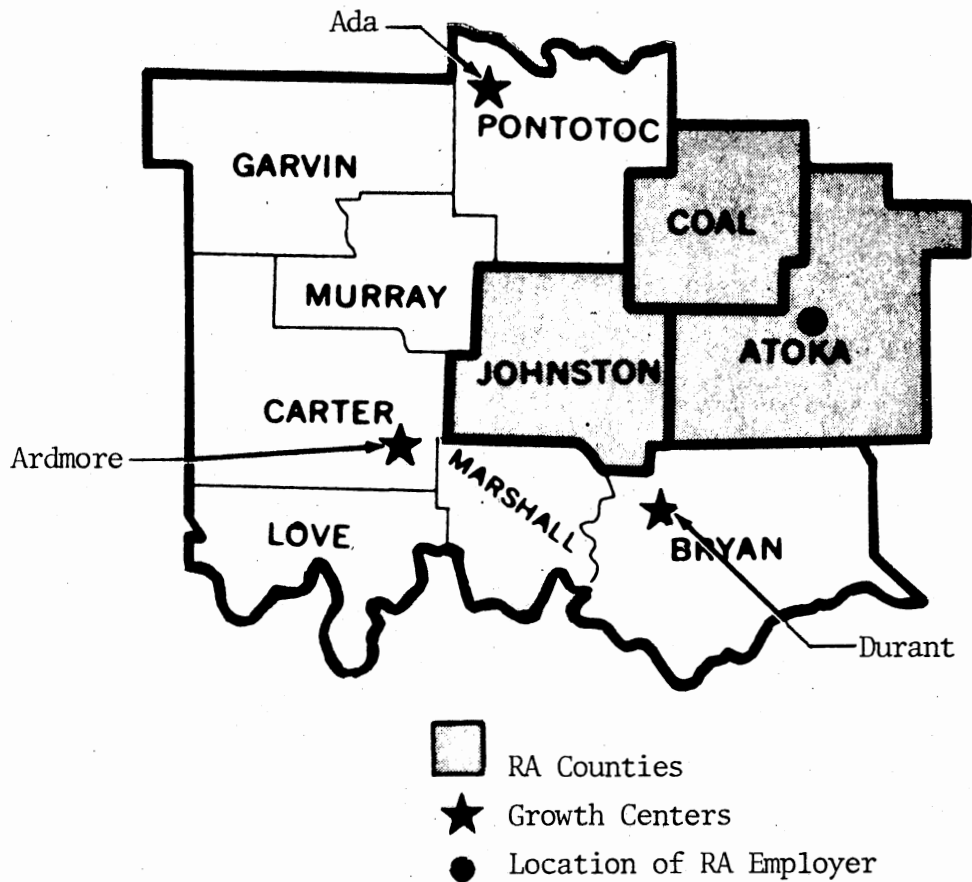
The most controversial part of the legislation is the provision for the designation of economic development centers or growth centers (GC) as they will be called. In Milkman's (40, p. 125) view, a center is "expected to provide infrastructure, jobs, and services not otherwise available to residents of the distressed hinterland . . . it is expected to serve as a center for migration in the area." This so-called GC policy is the attempted United States effort at implementation of the growth pole theory discussed above. Specifically, Title IV, Part B of PWEDA, authorizes the Secretary of Commerce:

. . . to designate as "economic development centers," in accordance with such regulation as he shall prescribe, such areas as he may deem appropriate, if ----

(a) the proposed center has been identified and included in an approved district overall economic development program and recommended by the State or States affected for such special designation;

(b) the proposed center is geographically and economically so related to the district that its economic growth may reasonably be expected to contribute significantly to the alleviation of distress in the redevelopment areas of the district; and

(c) the proposed center does not have a population in excess of two hundred and fifty thousand according to the last preceding Federal census (78, p. 147).



Source: U. S. Department of Commerce, Economic Development Administration. Detailed Case Studies: Supporting Documentation for the EDA Growth Center Evaluation. February, 1972.

Figure 4. The SODA District, Growth Centers, and Redevelopment Area Counties

Implementation of the Growth
Center Strategy

The sequence of events leading to the designation of SODA as an EDD and Ada, Ardmore, and Durant as GCs provides the starting point for the SODA case study. Although 67 districts had been authorized for establishment by September, 1966, and Corpus Christi, Texas, designated as the first GC in December, 1966 (40, p. 130 and p. 170), SODA did not receive its EDD designation until February, 1967. Ada was the first GC designated, followed by Ardmore and Durant (40, p. 154).

EDA policy statements implementing and interpreting PWEDA are issued as Economic Development Orders. The first (MEDO 1-28) was issued January, 1967 (83, Appendix D3). Although this is the MEDO under which all three SODA growth centers received their designation, it is but a one-page restatement of Part B of PWEDA (*supra*, p. 35).

MEDO 1-28 was revised and expanded by the version issued in March, 1968. Although SODA's growth centers were already designated, the new MEDO, entitled "Economic Development Center Strategy," is considerably more interpretive than the first (83, Appendix D5). The strong wording in this EDA policy statement is intended to insure that expenditures in GCs benefit the RAs of EDDs by directing that communities designated as GCs be the places most likely to contribute to alleviating distress in district RAs. Furthermore, projects undertaken within centers are to be those "directly improving the employment opportunities of unemployed or underemployed residents of redevelopment areas and/or making public services and facilities more readily available to residents of such areas" (83, p. D.6).

Additional administrative criteria are imposed by the new MEDO. To receive a GC designation, the candidate center must be establishing or implementing a comprehensive planning program which includes a strategy for assimilating unemployed and low-income residents of RAs into the GC's economy. Moreover, "each center should have a sizeable local market, a relatively large well-trained labor force, the prospect of developing a diversified economy, and a population base of at least 25,000" (83, p. D.7). The second MEDO was still in effect at the time the growth center program was evaluated in 1970 and influenced the content of SODA Positive Action Program (PAP) documents and project applications submitted after its issuance (83)(80).

This brief introduction cannot fully capture the political and legislative firmament from which United States depressed-area policy has been born. However, it does provide some background for this study which seeks, among other objectives, to look again at the GCs of an EDD which is a key element of Milkman's (40, p. 125) earlier evaluation, an evaluation allegedly showing "that EDA growth centers are not functioning in [the] prescribed manner."

Summary

Three topics were examined in this chapter. First, the evolution of key theoretical concepts was sketched. Second, a selected review of issues raised by the intuitively appealing concept of polarized growth revealed both their scope and unsettled nature. Third, a review of enabling United States legislation demonstrates that the host of unsettled issues has not prevented application of Perroux's ideas.

Perroux developed his polarized growth process to explain what he perceived as an illusion held by residents of small European nations that the small geographic size of their nations was responsible for their economic woes. To dispel this illusion he introduced the concept of multidimensional space, one dimension of which is economic space. Perroux thought growth resulted largely from Schumpeterian innovation impulses which tended to collocate in vectors of economic activity he called poles of growth. Later, Boudeville extended the process to explain growth in geographic space.

The concept of polarized growth holds much appeal for some people concerned with economically-depressed regions. They believe that, by using legislative policy to direct economic activity toward selected communities in lagging regions, job opportunities will be provided and distress in the surrounding area alleviated.

Policy makers in the United States have instituted a GC strategy without waiting for the solution to unsettled theoretical issues. However, resources were spread too thin to achieve desired results under the ARA. By adopting the GC strategy, the EDA has given itself a logical reason to limit the communities in which projects are placed. Nevertheless, over the years the number of districts and GCs across the nation have proliferated. This tendency is probably politically motivated. The pressure to throw a little chunk of the political pork barrel to every constituent community is great, and may even be a necessity for administrative survival.

Empirical evaluation of the GC strategy is scanty. Milkman's (40) (80)(83) study is mentioned in this chapter. However, his study was conducted only three years after SODA growth centers were selected. As

will be observed in the fourth chapter, many of the job-creating projects in SODA had barely been approved by the time the first study of projects was undertaken. However, before the results of one decade of GC strategy are examined, the stage needs to be set by documenting SODA as an economically-distressed region.

CHAPTER III

POST WORLD WAR II REGIONAL RESOURCE DIMENSIONS

A main goal of national efforts to redevelop a region is to cause changes in the economic structure of the region relative to the national economy (21, p. 16). This goal is especially justifiable if, by increasing the utilization and productive capability of the resources of a lagging region, real national output and income can be increased. The purpose of this chapter is to present a synopsis of recent trends in dimensions of human and natural resources of SODA as background for analysis of the effects of EDA-funded projects.

A Regional Relative to National Approach

The "bread and water" of regional development planning "is knowledge of basic and human natural resources of the region" (21, p. 10). Furthermore, legislation promoting development efforts emphasizes regional differences from national norms as indicators of regional status (53, p. 63) (72, p. 4) (78, Titles IV, V). Therefore, the general approach taken in this chapter is a comparison of selected human and natural resource dimensions of SODA with their national counterparts.

Clues to causal forces at work are sought with this description of the SODA economy. However, interpretation is clouded because an adverse

long-term deviation of a regional time series from its national norm may indicate more than one structural weakness in a regional economy. For example, weaknesses in human resource statistics may indicate under-investment in regional human resources, under-investment in regional productive capital, or both. Thus, caution must be used in interpreting descriptive data lest a causal force be spuriously identified.

Benjamin Chinitz's (16)(49) Taxonomy of Distressed United States Areas provides a framework for the discussion. Chinitz identified seven types of distressed areas, and enumerates a set of characteristics for each. They are:

Model I - rich and rapidly growing distressed areas

Model II - well-to-do mature distressed areas

Model III - not-so-poor depressed rural areas

Model IV - poor depressed rural areas

Model V - Appalachia

Model VI - large city ghettos

Model VII - Indian reservations

Model IV (poor depressed rural areas) fits SODA. The identifying characteristics for Model IV areas are that:

- a. The areas be a low-income area whose median level family income is less than 40% of the national average,
- b. declining agriculture be a factor,
- c. community facilities be primitive,
- d. the population be relatively unskilled and uneducated,
- e. often a majority of the population is Negro,
- f. out-migration has been heavy,
- g. the level of employment may be high, but the income generated is insufficient (16, p. 140).

The synopsis that follows contrasts SODA resource characteristics with the Model IV set. Detailed considerations then follow.

Recent Regional Resource Trends

Synopsis

The geographic area of interest is located in south central Oklahoma (Figure 1, p. 3) (Figure 4, p. 36) and currently is known by four names: SODA, The Oklahoma Ozarks, Oklahoma Planning Region IV, and Fun Country. The Southern Oklahoma Development Association (SODA) name was chosen when the ten counties originally organized to apply for Economic Development District status under the Public Works and Economic Development Act. Additionally, the region is part of the western edge of the original Ozarks Regional Commission Area, a multistate area whose commission was authorized by Title V of the same Act. The whole Ozarks area exhibits many of Chinitz's Model IV socioeconomic characteristics. The Region IV designation was assigned by the Oklahoma Industrial Development and Park Commission when it delineated substate planning regions throughout Oklahoma and was made official by an Executive Order of the Governor issued May, 1971. The Fun Country title is the name given the ten-county area by the Park Commission to emphasize its tourism and recreation aspects.

SODA fits Benjamin Chinitz's Model IV distressed area stereotype well. Several basic measures of human resources provide typical values. For example, the average level of education, although increasing, lags relatively further and further behind the nation. Moreover, the distribution of individuals by age class indicates that SODA's population is

relatively older than the national population. Additional evidence is provided by unemployment rates and median family incomes. The regional unemployment rate was greater than the national one until 1970 and over time, relatively more SODA families have received incomes below the national median. Although industrial employment opportunities developed in the region in industries similar to national ones, the growth rate of those opportunities is slower than the national rate. Net migration patterns reflect a reversal of a long-term trend. Whereas net out-migration was common during the fifties, some counties exhibited net in-migration during the sixties, perhaps signalling an end to the exodus from SODA.

Basic natural resource measures also support SODA's designation as a depressed rural region. Regional agriculture, for example, has followed national trends in that farm consolidation has occurred for two decades, accompanied by a decline in the relative importance of agriculture as a source of regional employment. Moreover, the region's agricultural product has shifted from grain crops to a livestock orientation. Additionally, mineral resource statistics suggest that this once important source of regional income and jobs no longer has the strength it once did.

This synopsis can be ended on an optimistic note, however. SODA residents have about two and a half times the per capita surface area of inland water available to them as is available nationally. Thus, perhaps the recreation and retirement industries are still avenues of regional opportunity. The detailed analysis supporting these conclusions is set forth in the following subsection, beginning with indicators of the quantity and quality of regional human resources.

Human Resource Measures

Education. One simple indicator of human resource quality is the average level of education attained by post school age adults. Median school years completed by persons 25 years old and over is presented in Table II for the years 1950, 1960, and 1970, by county. As can be seen, the educational level rises for both males and females each decade. However, the national level does too. Note that in 1950, Carter county males attended school a median of 8.8 years, only 0.2 of a year less than the national median. If the difference between county and national median years completed is defined as the "education gap," then by 1960 this gap had widened to 0.4 of a year, even though a median of 9.9 years of school had been completed by Carter county males. The trend continued to 1970. Median years completed jumped to 11.5, but the gap between Carter county and the nation widened to 0.6 of a year. The Carter county trend is typical of SODA counties. Even though the median years completed increases from decade to decade, the national median increases more rapidly.

Carter and Pontotoc have been the two leading counties over the three decades, although Bryan and Love counties have both moved repeatedly upward in the rankings. The expansion of Southeastern State University in Durant and its ready accessibility can be offered as an explanation of the Bryan county move, although Love county has no such handy explanation. A possible explanation is that Garvin, Murray, Carter, and Love counties lie along a major transportation route (Interstate 35) which is becoming a development axis between Dallas/Ft. Worth and Oklahoma City. The observation that Garvin and Murray counties,

TABLE II
 EDUCATIONAL ATTAINMENT BY PERSONS TWENTY-FIVE
 YEARS OF AGE & OVER

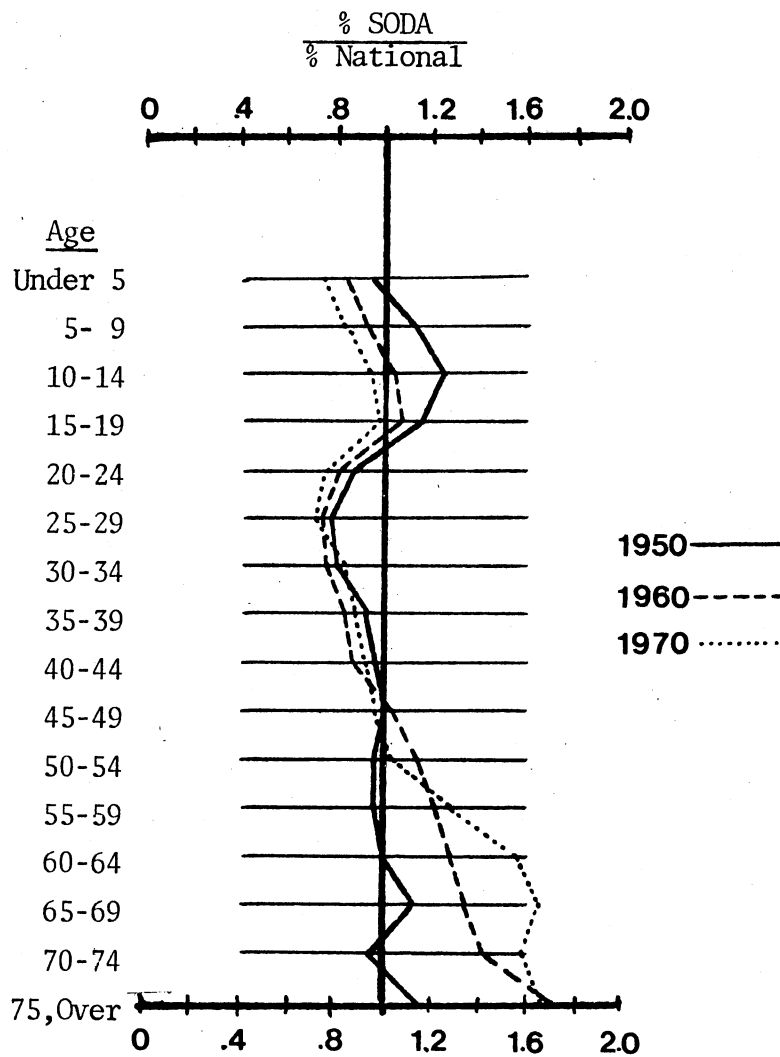
1950		1960		1970	
County	Med. Years	County	Med. Years	County	Med. Years
Males					
Atoka	7.5	Coal	8.1	Johnston	8.6
Coal	7.6	Atoka	8.2	Atoka	8.7
Love	7.8	Johnston	8.2	Coal	8.9
Johnston	8.0	Love	8.4	Marshall	9.3
Murray	8.3	Marshall	8.6	Love	9.5
Bryan	8.4	Murray	8.6	Murray	10.0
Marshall	8.4	Bryan	8.7	Garvin	10.3
Garvin	8.5	Garvin	8.5	Bryan	10.4
Pontotoc	8.6	Pontotoc	8.8	Pontotoc	11.1
Carter	8.8	Carter	9.9	Carter	11.5
State	8.9		10.0		12.1
Nation	9.0		10.3		12.1
Females					
Atoka	8.0	Atoka	8.4	Coal	9.0
Coal	8.2	Coal	8.5	Atoka	9.2
Marshall	8.4	Johnston	8.7	Johnston	9.2
Johnston	8.5	Love	8.9	Love	10.2
Love	8.5	Murray	8.9	Marshall	10.4
Garvin	8.7	Garvin	9.0	Garvin	10.6
Bryan	8.8	Marshall	9.1	Murray	10.6
Murray	8.8	Bryan	9.3	Bryan	10.8
Pontotoc	9.1	Pontotoc	9.5	Pontotoc	11.4
Carter	9.3	Carter	10.6	Carter	11.4
State	9.6		10.6		12.1
Nation	9.6		10.7		12.1

Source: U.S. Bureau of the Census, U.S. Summary, Detailed Characteristics (1960, PC(1)1D) Table 173, and General Social and Economic Characteristics (1970, PC (1)C38) Table 120.

also lying along the interstate highway, have moved up or at least remained the same in ranking while other counties have fallen, backs up this intuitive conclusion.

Age. Another indicator of the quality of regional human resources is the distribution of individuals by age class relative to the same distribution nationally. Figure 5 gives indicators of this type. Each value plotted represents the proportion of the regional population falling in a particular age bracket relative to the proportion of the national population falling in the same age bracket. A ratio greater than one indicates that the region has a relatively greater proportion of its population in the age class being considered than the proportion in the same age class nationally.¹

A clear trend is evident over the two-decade period, which can be best viewed by dividing the entire distribution into three segments. The first segment is the younger-than-working-age population. The pattern of Figure 5 indicates that in 1950 relatively more individuals were in this category than were in the same category nationally, although by 1970, the pattern for this segment had reversed. The second segment is the working-age years (about 16 to 50). This category changes little over the two-decade period. Each decade the pattern indicates relatively fewer working-aged individuals regionally than nationally. Finally, the pattern for the age brackets over age 50 shows a consistent shift from a 1950 position roughly on a par with the nation to the 1970 one indicating that individuals in their elder years are about 1.6 times more prevalent than nationally. Thus, the age composition seems to indicate a region whose working-aged human resources have educated themselves and then fled, seeking better job opportunities elsewhere.



Source: U.S. Bureau of the Census, U.S. Censuses of Population, 1950, Vol. II (P-B36) Table 41; 1960 Vol. PC(1) 38B Table 27; 1970 Vol. PC(1)-B-38 Table 35.

Figure 5. Distribution of Individuals by Age Class, SODA Relative to Nation (1950, 1960, 1970)

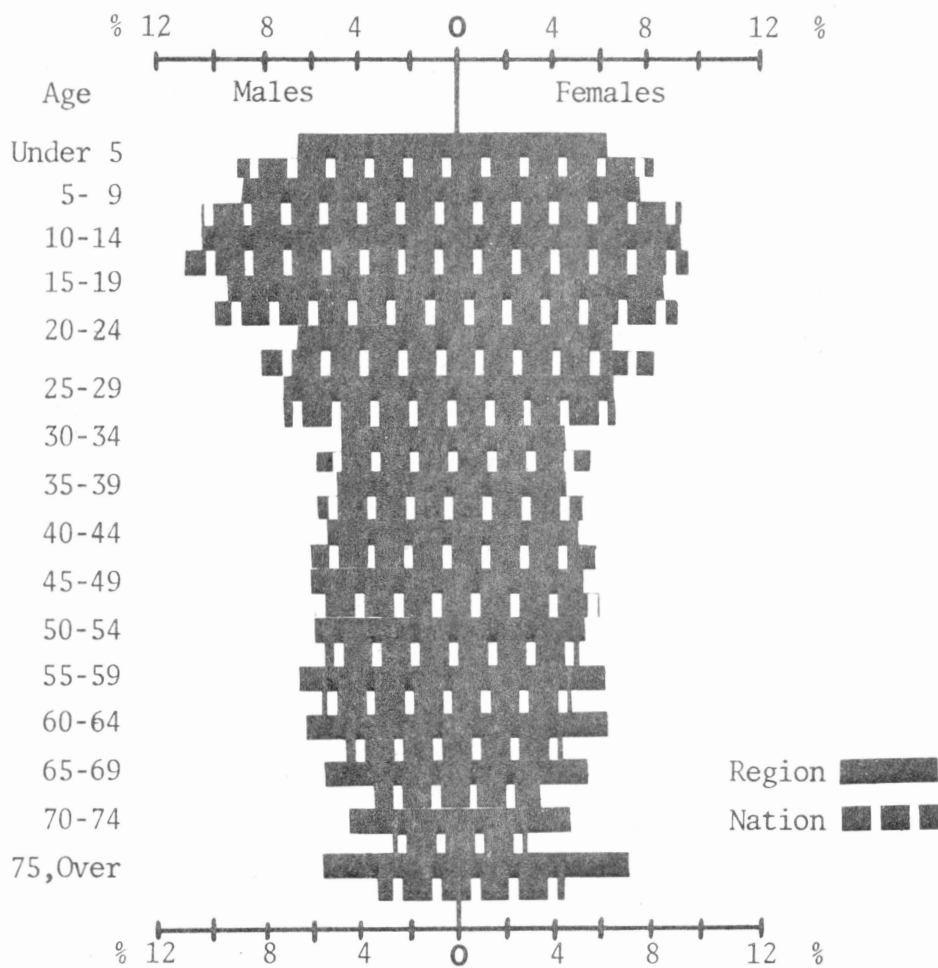
The age tree given in Figure 6 substantiates the long-term trend. It proportionately distributes SODA's population as of the 1970 census into 16 classes. The pattern exhibited is typical of an area whose population is heavily weighted with older folk.

Unemployment Rates. Table III lists SODA and national unemployment rates and the difference between them. The SODA rates are arithmetic averages of the average annual percent of the civilian labor force unemployed. The positive gap, indicating that regional rates exceed national rates, persists until 1970. The gap, however, progressively narrows, and even becomes negative for three years. The longest recession since the Great Depression began in the third quarter of 1973, and an increase in the national unemployment rate accompanied it. The positive gap reappeared in 1974 and increased in 1975.

The series of unemployment rates in Table III lends support to the belief that a high level of national economic activity is needed if progress is to be made toward alleviating regional distress (86, p. 11). Fluctuations in SODA unemployment rates, moreover, appear to lag the national rates. For example, the national low of 3.5 percent occurred in 1969, about four years before the 1973 SODA low.

The average regional rate also masks intraregional variability. For example, the 9 percent, 1975 regional average does not reveal the fact that the unemployment rates in the 3 RA counties (Atoka, Coal, and Johnston) were 13.3, 16.8, and 7.9 percent, respectively.

Income. Another facet of the quality of regional human resources may be observed by considering the distribution of families by money income class. The assumption is that money income serves as a proxy for



Source: See Figure 5.

Figure 6. Distribution of Individuals by Age Class, SODA Region, 1970

TABLE III
 UNEMPLOYMENT RATES (SODA vs.
 UNITED STATES)

Year	SODA (percent)	United States (percent)	GAP= SODA- Nation
1962	8.8	5.6	+3.2
1963	8.9	5.7	+3.2
1964	8.2	5.2	+3.0
1965	7.4	4.5	+2.9
1966	6.0	3.8	+2.2
1967	6.0	3.8	+2.2
1968	5.2	3.6	+1.6
1969	4.9	3.5	+1.4
1970	5.3	4.9	+0.4
1971	5.2	5.9	-0.7
1972	5.3	5.6	-0.3
1973	3.5	4.9	-1.4
1974	5.8	5.6	+0.2
1975	9.0	8.5	+0.5

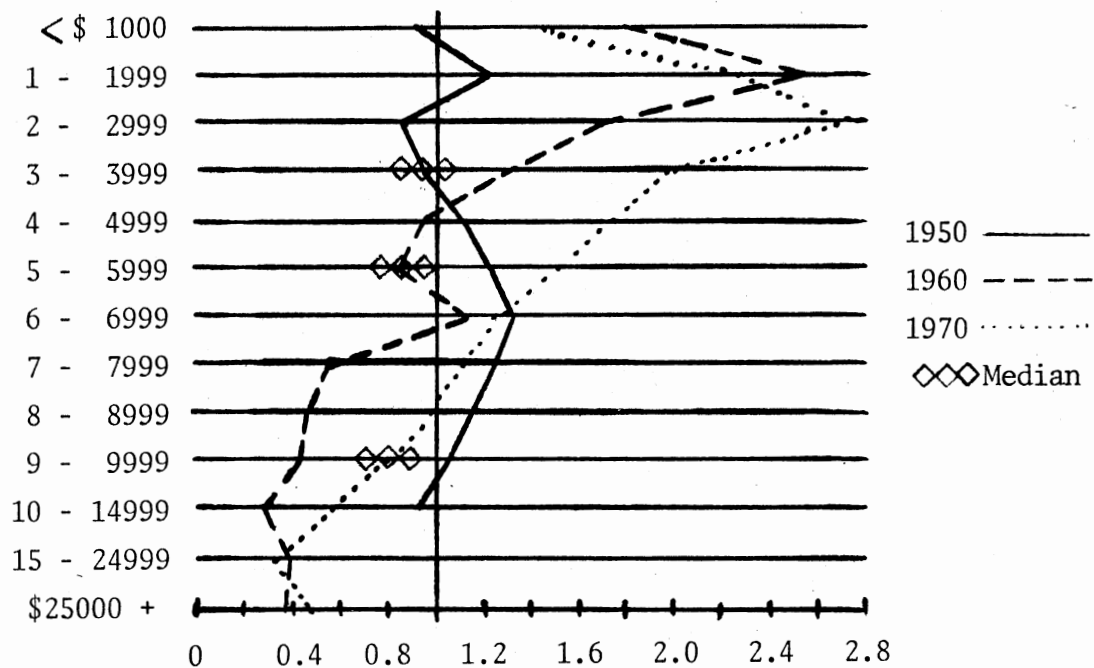
Sources: (SODA) are average annual rates averaged for all but Garvin County (1962-1969) and all counties (1970-1975) from the Oklahoma Employment Security Commission Handbook of Labor Force Data. Vol. 1 (1952-1963), Vol. 2 (1964-1967), Vol. 3 (1968-1971) give information based on a "place of work" concept; Vol. 4 revised (1970-1973), Vol. 5 (1974-1975) give information based on a "place of residence" concept.

(United States) is from the Economic Report of President, 1976, Table B-24, p. 199.

the return to the sale of human resources by regional households. The technique is the same as used in the study of ages, with each point (on Figure 7) representing the proportion of the regional families falling in a particular income bracket relative to the proportion of the national population falling in the same income bracket.² A ratio greater than one indicates that the region has a relatively greater proportion of its population in the income class being considered than falls in the same class nationally.

Three difficulties with analysis of this income distribution need to be mentioned. First, there are no particularly meaningful groupings of income classes, as there are groupings of age classes for an age distribution. Whereas, the categories of younger-than-working age, working-age, and older-than-working age give a rough indication of the productive potential of the regional population at a point in time, about the best that can be done for the distribution of families by money income is to include hash marks for the median income, nationally. The second problem of comparing income distributions at different points in time is that figures for all brackets for each census are not available at the county level. Finally, each distribution is biased upward, relative to the distribution for earlier years. This bias is due to inflation over the two decades. Logically, the inflated values can be corrected by dividing by the appropriate regional and national price indices, but county-specific price indices are nonexistent.³

The outstanding feature of Figure 7 is the relatively large number of families in the higher-than-national median income classes (in 1950) when compared with the higher-than-national median categories (in 1960 and 1970). The 1950 values are relatively large in two senses: first,



Source: U. S. Bureau of the Census, General Social and Economic Characteristics (1970), PC(1) C38 Table 124.

Figure 7. Distribution of Families by Money Income Class, SODA Relative to Nation (1950, 1960, 1970)

a relatively large number when compared with the nation, in 1950; second, a relatively large number when compared with the higher-than-national median income classes in 1960 and 1970. In fact, Figure 7 indicates (relative to the nation) that more SODA families are finding themselves with lower-than-national median incomes.

"Economists speak of the demand for productive factors as a derived demand" (60, p. 557), derived from the demand for the product they produce. Therefore, a look behind income to the industries employing regional residents may provide insight into the relative decline in the number of families earning the median national income.

Regional Industrial Employment. The shift-share technique is used to compare regional employment changes with national (9) changes. This technique splits the absolute change in regional employment, within an industry and between two time periods, into three components. The first, designated the national growth component, is an amount of regional employment change proportional to the national employment change for the time period being considered. The second, designated the mix component, reveals whether or not the distribution of regional industries is fast or slow growing relative to the same distribution nationally. Finally, the regional share component indicates whether or not the region has an increasing or decreasing share of this national distribution. This verbal description of the three components may be symbolically represented as:

$$E_{i,1960} - E_{i,1950} = rE_{i,1950} + (r_i - r)E_{i,1950} + (r_{ij} - r_i)E_{i,1950},$$

where $E_{i,1960}$ is the 1960 employment in industry i within the region;

$E_{i,1950}$ is the same data for 1950; r is the national overall rate of employment growth; r_i is the national rate of growth in industry i ; r_{ij} is the rate of growth in industry i within the region.

Table IV shows employment in SODA in each of nine major industrial sectors. The data is from a recent publication by Ashby (10) in which census data were made comparable for 1940, 1950, 1960, and 1970. The line for Agriculture, Agricultural Services, Forestry, and Fisheries will be used as an illustration of the computations. Columns one, two, three, and four of this line list actual employment levels in the SODA agricultural industry for 1940, 1950, 1960, and 1970, as aggregated from county data compiled by Ashby (10).

Specifically, consider the change in agricultural sector employment between 1960 and 1970 (symbolically, $E_{i,1970} - E_{i,1960}$). There was a 19.49 percent national growth in the nine major sectors during this decade (symbolically, $r = .1949$). If SODA's agricultural employment had grown at this overall national growth rate, then 1,418 more individuals would have been employed in agriculture. This national growth component results from applying the overall national employment growth rate to the 1960 regional level of agricultural sector employment (symbolically, $rE_{i,1960} = .1949 \times 7278$).

Nationally, employment in the agricultural sector decreased by 1,608,444 individuals between 1960 and 1970, a 35.55 percent decline, in spite of the fact that overall industrial employment grew 19.49 percent. This is reflected by the industrial composition mix rate, which is the difference between the national growth rate in an industry and the national all-industries growth rate (symbolically, $r_i - r = -35.55 - 19.49 = -55.04$). Expressed in absolute terms, regional agricultural

TABLE IV

EMPLOYMENT AND RELATIVE SHIFT IN EMPLOYMENT
 BY MAJOR INDUSTRIAL SECTOR, SODA REGION
 (1940, 1950, 1960, 1970)

Industrial Sector	Total Employment				National Growth Effect			Industrial Mix Effect			Regional Share Effect			Regional Share Rates		
	1940	1950	1960	1970	1940-50	1950-60	1960-70	1940-50	1950-60	1960-70	1940-50	1950-60	1960-70	1940-50	1950-60	1960-70
Ag, Ag Services, Forestry, Fisheries	28477	16881	7278	4407	7593	2613	1418	-12464	-8877	-4006	-6726	-3339	-284	-.2362	-.1978	-.0390
Mining	2688	4877	4767	3265	717	755	929	-679	-2161	-1199	2151	1296	-1232	.8002	.2658	-.2584
Contract Construction	2093	3948	4545	4789	558	611	886	844	-50	-252	453	35	-390	.2162	.0089	-.0857
Manufacturing	2575	3480	4690	7539	687	539	914	284	266	-447	-65	405	2382	-.0253	.1164	.5078
Transportation, Communications, Public Utilities	2353	3553	3404	3151	627	550	663	369	-454	-242	204	-245	-674	.0866	-.0689	-.1980
Wholesale & Retail Trade	8877	10842	12161	12214	2369	1679	2370	1168	-101	893	-1570	-259	-3210	-.1769	-.0238	-.2639
Finance, Insurance, & Real Estate	998	1106	1357	1661	266	171	265	38	312	250	-196	-233	-210	-.1965	-.2104	-.1549
Services	10206	10381	12323	15908	2721	1607	2402	-979	2362	2870	-1568	-2027	-1686	-.1536	-.1952	-.1368
Total Government	1540	2101	2317	2938	411	325	452	1090	532	101	-940	-641	68	-.6104	-.3052	.0295
Totals	59807	57169	52842	55872										-.2959	-.6102	-.5994

Source: Regional Employment by Industry, 1940-1970. Lowell D. Ashby and David W. Cartwright, U.S. Department of Commerce, Bureau of Economic Analysis, 1975.

employment would have decreased by 4006, had it declined at the composite industrial mix rate (7278×-55.04).

The third component mentioned above was the regional share effect. This component indicates whether or not agricultural employment in SODA declined during the decade of the sixties as rapidly as it did nationally. The data reveals that agricultural employment declined at a regional rate 3.90 percent faster than the declining national rate ($-.3945 - (-.3555)$), resulting in another 284 fewer employed in regional agriculture in 1970 than in 1960 ($-.0390 \times 7278$).

In sum, this analysis shows that agricultural employment in SODA between 1960 and 1970 would have increased by 1,418 individuals had SODA agricultural employment grown at the national overall industrial growth rate. However, SODA agricultural employment needed to decline by 2,587 individuals for the decline in regional agricultural employment to match the national decline in agriculture. SODA's agricultural employment, in fact, declined more rapidly than nationally because agricultural employment was 2,871 less than in 1960. Similar calculations are given in Table IV for the remaining eight major sectors.

Although the shift-share technique is incapable of separating the influence of demand from supply, it can reveal where regional-national differences lie. Several alternative views of these differences are possible, each equally valid in a descriptive sense.

One view is obtained by forming the product of the national all-industries growth rate and the total of the employments for the industries given in Table IV at the beginning of the decade. This is tantamount to assuming that regional industrial employment grew at the national rate. Such computations indicate that the 1950 total regional

employment would have been 75,751 instead of 57,169, that the 1960 total regional employment would have been 66,019 instead of 52,842, and that the 1970 total regional employment would have been 63,141 instead of 55,872, if SODA industrial employment growth had maintained the national pace. Thus, for three decades the region has failed to generate industrial employment opportunities as fast as has the nation.

Job creation is the viewpoint emphasized in Table IV because a main objective of regional development programs is job creation. This table reveals that the leading job-creating industry in SODA, in terms of total jobs created over three decades, is the services industry (generating a total of 5,702 jobs). Manufacturing is second, having generated 4,964 jobs over the three decades. Heaviest losses were sustained by agriculture, losing a three-decade total of 24,070 jobs.

A third viewpoint is obtained by comparing national and regional industrial structures. Sectors with negative industrial mix effects grew at rates slower than the national all-industry growth rate and will be designated national slow-growth sectors. Sectors with negative regional share effects grew at rates slower than those for the same sector, nationally, and will be designated regional slow-growth sectors. For example, agriculture has been a slow-growth sector for three decades nationally and regionally. Mining, a national slow-growth sector for three decades, has become a regional slow-growth sector in the sixties, as has contract construction. Moreover, both mining and contract construction have become regional slow-growth industries about a decade later than they became national slow-growth sectors.

Manufacturing behaves differently. It has become a national slow-growth sector only in the sixties but has been a regional fast-growth

sector for the last two decades. SODA has a past history of strength in both agriculture and mining (to be discussed in detail later). However, the shift-share data indicates that agriculture and mining have become declining sectors for employment opportunity and that manufacturing has become the number one SODA growth sector. Regional share effects for the balance of the sectors (except for government in the sixties) have not yet followed their positive national upturn. Since upturns in the demand for various services (merchandising, professional, government, etc.) logically follow industrialization, and since SODA is in the stage of industrialization, these sectors should become areas of future regional employment opportunity.

Comments about the generation of polarizing forces by key or propulsive industries were made in Chapter Two (*supra*, p. 15). It may be recalled that Hansen (24, p. 717) thinks a propulsive industry should belong to a relatively fast growing sector. In these terms, the national fast-growth sectors are those (in Table IV, *supra*, p. 56) beneath manufacturing (with positive, industrial mix effects). However, SODA's greatest growth has come from manufacturing, a slow-growth national sector. Perhaps growth in a sector that has lost its national luster is more propulsive than no growth at all and is thus beneficial in depressed regions.

Regional share rates are given in the last three columns of Table IV. Symbolically, each computation is of the form $r_{ij} - r_i$, where r_{ij} and r_i are as defined above. If a regional industry grows at a rate less than national rate for the same industry, then the difference between the rates will be negative (the difference will be positive for the opposite case). Incidentally, the sign of the regional share rate

determines the sign of the corresponding regional share effect, and thus their sign pattern (positive or negative) is the same. The sum of regional share rates for a decade provides a simple comparison of the national versus regional industrial structure.

The totals of all rates for a decade are given at the bottom of their respective column. A positive total implies that SODA industries have, on balance, grown at rates faster than the same industries nationally, whereas a zero total implies growth at rates similar to national rates. In this case, for all three decades, the sum of the share rates is negative, indicating slower growth in SODA industries, on balance, than the same industries nationally, although the sum for the decade of the sixties is not as negative as the sum for the decade of the fifties. Therefore, the trend of the first two decades has reversed, and regional industrial growth rates have converged toward national ones.

Migration. Chinitz cites heavy out-migration as one characteristic of depressed rural areas (supra, p. 42). Net migration rates for SODA counties over the fifties and sixties are available in Bowles' (14) net migration data. However, comparisons with SODA counties may be more meaningful if two trends evident in this data are considered first.

The first trend is revealed by Bowles' (14, Part 7, p. 208) cross-tabulation of age-specific net migration with the 1959 median family income (as reported in the 1960 Census of Population). The under \$2,000 income class is the most relevant of all income classes because SODA families falling into this class are 2.6 times more prevalent than nationally (Figure 7, supra, p. 53). Although Bowles distributes ages into

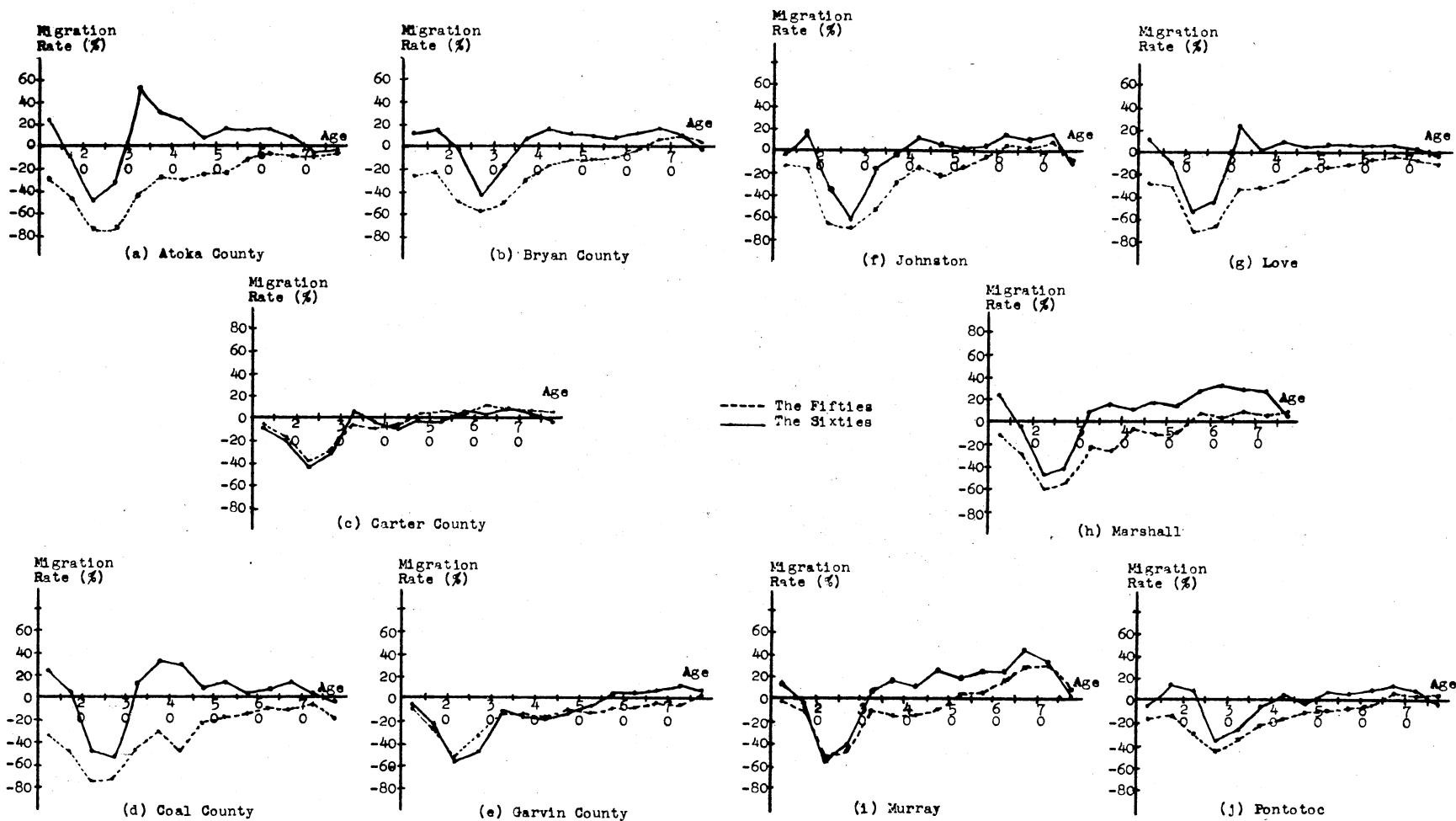
seven cohorts for each income class, all need not be specifically mentioned to reveal the trend. For example, Bowles' data indicates net out-migration for all cohorts below 60 years of age, with the highest rate (53 percent) being in the 20-29 age bracket. Moreover, net in-migration occurs at low rates in the 60-74 year cohorts, although the over 75 age class reverts to the out-migration status. The relevance of this trend in SODA's context will be discussed shortly.

Net migration patterns change as successively higher income classes are considered. For example, in-migration age cohorts switch to out-migration ones and vice versa. Counties falling in the \$6,000-\$7,499 income class show that in-migration occurred in the 24-34 age bracket (at about a 22 percent rate), as opposed to out-migration for counties in the under \$2,000 income class.

A tabulation of age-specific net migration into six classes on the basis of the proportion of the employed population engaged in agriculture as calculated from data in the 1960 Census of Population reveals the second trend (14, Part 7, p. 226). The 10-19.9 percent class is most relevant because 13.7 percent of the SODA labor force in 1960 was employed in the agriculture sector (Table VI, p. 70). Bowles' data indicates net out-migration in the 20-34 year old bracket, with the highest rate (14 percent) being in the age 25-39 category. Net in-migration is indicated for all other age cohorts with the highest rate averaging about 12 percent in the 60-74 age bracket. In-migration cohorts switch to out-migration ones as the proportion employed in agriculture increases. For example, in counties having 50 percent and over employed in agriculture in 1960, all age cohorts indicate out-migration with the highest rate (63 percent) occurring in the 20-24 age bracket.

Plots of net migration rates by age for SODA counties should reflect these national income and agricultural sensitivities. SODA is an area of low median family and low per capita incomes. For example, the 1970 per capita income of Atoka and Coal counties (two of the three original RA counties along SODA's eastern border) averaged only 48 percent of the national amount, whereas per capita incomes for counties along SODA's western edge (Love, Carter, and Garvin), although fairing better, still averaged only 77 percent of the 1970 U.S. amount (22, p. 2) (33, p.15). SODA is also an area of declining agricultural employment. For example, in 1940, agriculture accounted for 67 percent of the combined Atoka and Coal county labor force, but only 10 percent in 1970. Agriculture, less important in SODA's three western counties to begin with, declined from 43 percent of their combined labor force to 7 percent over the same time period (10).

Figure 8 graphically portrays net migration rates for SODA counties over the fifties and over the sixties. Positive figures signify in-migration and negative ones, out-migration. All but two of the curves for the sixties indicate a partial reversal of the out-migration common in the fifties. The most dramatic difference has occurred in the poorer eastern counties (curves a and d), which had the largest proportion of their 1940 labor force engaged in agriculture and which have seen the greatest decline in the portion of their labor force devoted to agriculture. The least difference appears in curves for two of the three western counties (curves c and e), which were higher income counties with a smaller portion of their labor force devoted to agriculture in the first place.



Sources: Net Migration for the Population, 1950-60 by Age, Sex, and Color, by Gladys K. Bowles and James D. Tarver, The U.S.D.A., Economic Research Service. Net Migration of the Population, 1960-70, by Age, Sex, and Color, by Gladys K. Bowles, Calvin L. Beale, and Everett S. Lee, University of Georgia, Institute of Behavioral Research, December, 1975.

Figure 8. Net Migration Rates for SODA Counties (1950-1960, 1960-1970)

Out-migration characterizes the 20 to 30 year age cohort for both decades and all SODA counties, and although the rate for the sixties is below that for the fifties, it is still about 55 percent. This high out-migration rate is consistent with the 53 percent out-migration rate in the 20-29 age bracket for the low income counties from the national viewpoint discussed above. However, 55 percent is more than three times the national out-migration rate of 14 percent for counties having 10-19.9 percent of their labor force devoted to agriculture. Thus, young workers are leaving SODA more rapidly than their national counterparts. Since the proportion SODA's labor force engaged in agricultural pursuits has declined from 48 percent in 1940 to 8 percent in 1970, it is difficult to attribute the high out-migration of young SODA workers to maturing farm children. It is probably a more general phenomenon and youth from all family backgrounds are seeking their fortunes elsewhere.

Patterns for Atoka and Coal counties for the sixties are not typical of national low-income county trends. In-migration is indicated for all cohorts above age 30 except the oldest, whereas out-migration is the typical case. Particularly noticeable is the high in-migration evident for the upper working age (30-45 year old) group. Only a tenuous explanation may be offered, since job opportunities have blossomed in the growth center counties (Bryan, Carter, and Pontotoc) rather than the RA counties. It may be that the in-migrants are returning former out-migrants who have found themselves unable, with their meager skills, to better their lot and have returned to more familiar home territory.

Several patterns for the sixties indicate increasing in-migration (or reduced out-migration) rates with over age 30 cohorts. Bryan,

Carter, Garvin, Johnston, Marshall, Murray, and Pontotoc are counties exhibiting this trend. Some of these counties contain large lakes with excellent recreation facilities: Lake Murray (Carter and Love counties), Lake Texoma (Marshall and Bryan counties), and The Lake of the Arbuckles (Murray County). Retirement settlements have sprung up and grown rapidly around these lakes. Interstate 35 runs across four of the counties (Garvin, Murray, Carter, and Love) providing easy access to the Oklahoma City or Dallas/Ft. Worth metroplexes for retirees preferring rural residency.

The out-migration of the fifties has become the in-migration of the sixties, a trend which will probably continue through the seventies. However, a reversal of the out-migration in the 20-30 year cohort probably awaits creation of more job opportunities. Since further verbal comment will only be increasingly speculative, a more productive avenue of inquiry lies in pursuing dimensions of SODA's natural resource base.

Natural Resource Measures

A useful categorization of natural resources is surface and subsurface. Any region possesses a relative fixed endowment of subsurface resources because new mineral deposits are extremely slow in forming. However, quantities of surface resources, a region's endowment of which is largely determined by physical characteristics, are more controllable. For example, irrigation and fertilizer can overcome soil deficiencies to some extent, while reservoirs can be used to increase a region's water resources. Consider first, therefore, surface resources beginning with SODA's physical characteristics.

Surface Resources: Physical Characteristics. Topology, climate, and soil are three characteristics whose interaction plays an important role in determining the quantity and quality of regional surface resources. Although many determinants underlie each characteristic, their principal interaction may be readily understood. Topographical features (rivers, lakes, mountains, valleys, etc.) shape and modify climatic conditions (precipitation, temperature, and wind). These conditions, in turn, help determine soil characteristics and fertility.

Oklahoma is one of the Great Plains States. Topographically, it decreases in altitude from a northwestern high of about 4,900 feet to a southeastern Red River low of about 300 feet above sea level. River flow conforms with this altitude range. The Red River, which forms the southern border of both SODA and Oklahoma, is fed by the Boggy, Blue, and Washita Rivers. The Red and Washita join to form Lake Texoma, whereas the Blue and Boggy join the Red downstream from the lake.

Three climatic regions are found in Oklahoma. The eastern side of the state falls in the humid region, and the western in the semiarid. However, midstate SODA also falls climatically midway, and thus in Oklahoma's subhumid region. Normal annual precipitation in the region ranges from 32 to 42 inches (47, p. 19). This relatively heavy precipitation is closely related to regional soil composition and, thus, to the vitality of regional agriculture.

Agriculture. Regional agricultural statistics reveal two decades of farm consolidation, accompanied by increased agricultural output and productivity. During this period of small farm decline, livestock has become the principal agricultural product at the expense of crops.

Moreover, even crop production has become livestock oriented. These product shifts have also been accompanied by both an absolute and relative decline in regional agricultural employment. A more detailed discussion of trends in regional agriculture follows. This discussion is backed by Tables V, VI, VII, VIII, and IX.

Agriculture censuses indicate a continual farm consolidation trend both regionally and nationally. Columns three and four of Table V provide quantitative evidence. The number of farms decreases, the average farm size steadily increases and converges toward the increasing national average. However, the trend toward fewer and larger farms has not been at the expense of either regional or national real agricultural output.

Regional and national farm output exhibits an increasing trend over the period represented by the five agricultural censuses, as is indicated by the index of real farm marketings in column two of Table V. This index is formed by deflating the market value of all agricultural products with an index of prices received for all farm products. Moreover, regional and national agricultural productivity has also increased.

The index of the value of real farm marketings per worker presented in column six highlights the increase in agricultural productivity. This index is obtained by dividing the value of real farm marketings by the number of workers producing the output and then expressing the results relative to 1950 as a base year. Although the family and/or hired worker series was discontinued with the 1964 Census of Agriculture, the output per worker at least doubled by 1964. Thus, there has been a long-term trend toward fewer and smaller regional farms accompanied by an increase in both agricultural output and productivity. The

TABLE V
POSTWAR SODA FARM CHARACTERISTICS

1	2	3	4	5	6	7	8	
Year	Real Farm Marketings (millions constant \$)	Index of Real Farm Marketings (1950=100)	Number of Farms	Average Farm Size (Acres)	Family and/or Hired Workers	Index of the Value of Real Farm Marketings per Worker (1950=100)	Index of the Value of Real Farm Marketings per Farm (1950=100)	Percent Acres in Farms Worked by Tenants
1950	11.3	100.0	15115	227.6	21693	100.0	100.0	24.0
1954	11.0	97.2	12299	272.5	24970	88.4	119.4	16.9
1959	16.7	148.0	9394	357.7	15020	213.8	238.2	10.3
1964	16.4	145.0	9740	350.0	discontinued	n.a.	225.0	9.1
1969	23.6	208.6	8784	385.6	discontinued	n.a.	359.0	n.a.
Postwar United States Farm Characteristics								
1950	11031.0	100.0	5388437	215.5	8568847	100.0	100.0	
1954	12126.0	109.9	4782416	242.2	9597343	98.1	123.8	
1959	13963.0	126.6	3710503	302.4	6332478	171.2	183.9	
1964	15710.0	142.4	3157857	351.6	discontinued	n.a.	243.1	
1969	17506.0	158.7	2730252	389.5	discontinued	n.a.	313.2	

Sources: (SODA)-- Col1, The market value of all agricultural products including crops, nursery products, hay, forest products, livestock, and poultry products from the U.S. Bureau of the Census, Census of Agriculture, Vol 1, Part 36, Oklahoma, Statistics for Counties, for the various years indicated divided by the Oklahoma all farm price index found in the Oklahoma Agriculture Experiment Station, Prices Received by Oklahoma Farmers (Publications P297, dated June, 1958, p. 153; P681, dated April, 1973, n. 39).

Col2, Each value in Col1 divided by the 1950 value as a base year.

Col3,4,5, The U.S. Bureau of the Census, Census of Agriculture, Vol 1, Part 36, Oklahoma Statistics for Counties

Col6, Each value in Col1 divided by the corresponding value in Col5, then expressed relative to 1950 as base.

Col7, Each value in Col1 divided by the corresponding value in Col3, then expressed relative to 1950 as base.

Col7, op. cit., ref. for Col3.

(U.S.A.) - Col1, Computed as Col1, above; market value of all agricultural products from U.S.D.A. Agricultural Statistics, 1972, Table 682, p. 562; price index from same source, Table 677, p. 553.

Col2, Each value in Col1 divided by the 1950 value as a base year.

Col3,4, op. cit., U.S.D.A., Table 623, p. 504; Table 624/Col3.

Col5, U.S. Bureau of the Census, Census of Agriculture, 1959, Vol II, General Report pp. 53, 233.

Col6,7, op. cit., Col6,7, above.

impact of these changes has been felt in agricultural employment and in the nature of the product produced and marketed by regional farms.

Table VI reveals that agriculture has become relatively less important as a regional employer. Agriculture accounted for only 7.9 percent of 1970 jobs, as opposed to 47.6 percent in 1940. However, manufacturing and trade are relatively more important in 1970 than 1940. Although they accounted for only 19.1 percent of region jobs in 1940, by 1970 their combined share had increased to 35.3 percent. Services have also become relatively more important, increasing its share from 17.1 percent to 18.5 percent. Thus, employment statistics indicate that agriculture is a declining source of regional jobs.

The nature of regional agricultural product has changed too. The value of four major agricultural product categories provide insight: all crops, poultry and poultry products, dairy products, and livestock and livestock products (Table VII). Although all crops can be further separated into field crops, vegetables, fruit and nuts, and forest and horticultural specialties, such detail is not warranted because field crops accounted for 93 percent of all crops in 1950 and for 94 percent in 1969. The total dollar value of all agricultural products has doubled over the five censuses, increasing from \$32.2 million to \$64.5 million. Livestock, the dominant product to begin with, has become relatively more important and crops relatively less, whereas poultry and dairy products have retained about the same position. An arbitrary division of SODA into western counties (Garvin, Murray, Carter, and Love, through which Interstate 35 runs) and all other counties reveals that about 40 percent of total 1950 product value came from the four western counties. By 1969, the western counties had increased their

TABLE VI
 RELATIVE IMPORTANCE OF MAJOR SODA
 INDUSTRIAL SECTOR EMPLOYMENT

Industry	Year			
	1940	1950	1960	1970
Ag, Ag svcs, for, & fish	47.6	29.5	13.7	7.9
Mining	4.5	8.5	9.1	5.8
Contract construction	3.5	6.9	8.6	8.6
Manufacturing	4.3	6.2	8.9	13.4
Transport, commo, pub util	3.9	6.3	6.4	5.6
Wholesale & Ret Trade	14.8	18.9	23.1	21.9
Finance, Ins, & R estate	1.7	1.9	2.5	3.0
Services	17.1	18.2	23.3	28.5
Total Government	2.6	3.6	4.4	5.3
Total	100.0	100.0	100.0	100.0

Source: Calculated from Table IV.

TABLE VII
ABSOLUTE AND RELATIVE IMPORTANCE OF SODA
AGRICULTURAL PRODUCT

Census Year	Total Product Value	All Crops	Poultry and Poultry Products	Dairy Products	Livestock and Livestock Products
(Dollars)					
1950	32,163,397	11,019,980	1,149,865	2,547,668	17,444,567
1954	27,770,510	9,012,669	921,213	2,874,615	14,962,013
1959	42,397,940	8,661,393	676,748	4,040,775	29,019,024
1964	40,533,503	12,319,489	1,092,352	4,178,582	22,943,080
1969	64,536,415	11,848,939	1,553,207	5,669,625	45,464,644
(Percent)					
1950	100.0	34.4	3.5	7.9	54.2
1954	100.0	32.5	3.3	10.3	53.9
1959	100.0	20.4	1.6	9.6	68.4
1964	100.0	30.4	2.7	10.3	56.6
1969	100.0	18.4	2.0	9.0	70.6

Source: U.S. Bureau of the Census, Census of Agriculture, 1950, 1954, 1959, 1964, 1969 Statistics for the State and Counties, OKLAHOMA.

share to 44 percent. The western counties produced about 43 percent of the crops and 35 percent of the livestock in 1950, increasing to 46 percent and 43 percent, respectively, in 1969. These intraregional dimensions do not yet indicate a shift in the composition of SODA's agricultural production toward "truck farm" commodities in response to the development corridor being catalyzed by Interstate 35. They do, however, support the contention that SODA's western counties are stronger than the rest.

Table VIII presents price indexes for the four product categories. Notice that the livestock index has almost always been the largest of the four. The real value of regional livestock product, obtained by deflating the money value in Table VII with the index in Table VIII, more than doubles, whereas the real value of crops becomes only half again as large. Thus, regional agriculture has become increasingly livestock oriented. This conclusion is further substantiated by Table IX, which gives quantities of various agricultural products produced. Notice therein that hay has become an increasingly important crop. Thus, not only have crops become relatively less important in regional agriculture, but also their composition has become more livestock oriented.

Water Resources. Water is a relatively abundant SODA resource. Table X provides a summary of the region's multipurpose federal, state, and municipal reservoirs. Almost all simultaneously serve flood control, water supply, water conservation, and recreational functions, although only Texoma is equipped for power generation.

A rough idea of the magnitude of SODA's manmade water resources can be had by comparing the per capita surface area of inland water

TABLE VIII
 INDEXES OF PRICES RECEIVED BY OKLAHOMA FARMERS
 FOR AGRICULTURAL PRODUCTS
 (1910-14 = 100)

Year	All Agricultural Products	All Crops	Poultry and Poultry Products	Dairy Products	Livestock, Livestock Products
1950	284	247	192	242	325
1954	252	255	195	239	251
1959	272	217	162	251	331
1964	247	221	170	252	275
1969	294	173	208	326	409

Source: Blakley, Leo V. and W. H. Kastens. Prices Received by Oklahoma Farmers, Oklahoma State University Processed Series P-681, 1973.

TABLE IX
SODA CROP PRODUCTION

Year	Winter Wheat (Bu)	Oats (Bu)	Barley (Bu)	Grain Corn (Bu)	Grain Sorghum (Bu)	Cotton Lint (Bales)	All Hay (Tons)	Wild Hay (Tons)	Alfalfa Hay (Tons)	Bean Soybeans (Bu)	Pea- nuts (Tons)
1950	106,600	328,000	n.a.	3,308,600	173,700	4,270	n.a.	n.a.	n.a.	n.a.	16,988
1954	323,800	1,412,300	84,700	683,300	113,300	18,030	n.a.	n.a.	n.a.	n.a.	6,798
1959	372,800	701,700	93,500	1,156,700	697,200	18,740	231,500	49,300	86,000	n.a.	12,020
1964	478,600	489,300	94,600	307,800	425,600	13,650	295,600	43,700	109,400	69,800	20,227
1969	368,600	318,100	73,700	230,000	491,800	9,850	308,300	43,200	138,300	82,700	21,593

Source: Annual Report, Oklahoma State Board of Agriculture.

Note: n.a. = not available

TABLE X
SODA MANMADE LAKES

Location County	Lake Name	Use	Surface Area (Acres)	Capacity (Acre- feet)	Built by, Year Completed
Atoka	Atoka	M	5,700	125,000	OKC, 1959
Bryan	Texoma	F,P,R	89,000	2,722,000	Corps, 1944
Carter	Mountain	M	133	1,534	Ardmore
	Site 13	M,R	462	6,739	SCS
	Site 18	M,R	248	3,701	SCS
Coal	Site 2	M,R	352	4,527	SCS
Garvin	Pauls Valley	M	750	8,500	Pauls Valley
Love	Murray	R	5,728	153,250	State, 1937
Murray	Arbuckle	F,M,R	2,350	72,400	BOR, 1967
	Veterans	R	70	1,260	State
Totals	10		104,793	3,088,471	

Source: Oklahoma's Water Atlas 1976, Publication No. 76 of the Oklahoma Water Resources Board, Oklahoma City, Oklahoma, 1976.

Notes: (Use) M = Municipal, F = Flood, P = Power Generation, R = Recreation (Built by) OKC = Oklahoma City, Corps = U.S. Army Corps of Engineers, SCS = USDA Soil Conservation Service, BOR = Department of the Interior, Bureau of Outdoor Recreation, State = State of Oklahoma.

available in the region with the same statistic for the nation as a whole. Only about one-quarter acre of inland water per person, based on 1970 populations, was available nationwide. Oklahoma residents fared better than the nation, because 0.32 acre per capita was available to them. However, the permanent resident of Region IV had 0.64 acres, over twice the national average, for their use.

Subsurface Mineral Resources. This section examines three facets of regional mineral resource development. First, a broad overview is provided. Second, the absolute and relative importance of major mineral production is considered. Third, the mineral industry as a source of regional employment is highlighted.

The distribution in 1974 of leading mineral products among SODA counties is given in Table XI. Petroleum is the region's leading mineral product. In fact, Table XI indicates that petroleum is the leading mineral product in eight of ten counties.

A rough idea of the relative importance of mineral production is obtained by comparing the regional value with the state value produced and by comparing regional mineral product value with regional agricultural product value. Table XI shows that regional mineral product value was about 17.0 percent of state mineral product value in 1969 and about 19.2 percent in 1974. Comparison of Table VII with Table XI reveals that mineral production is relatively more important than regional agricultural production: the value of 1969 mineral production was roughly triple the 1969 total agricultural product value. Rapid worldwide petroleum and natural gas price increases in 1974 account for the almost doubling of SODA and Oklahoma mineral production values between 1973 and 1974. Energy supply is a topic of considerable national concern. Since

TABLE XI

VALUE OF MINERALS PRODUCED IN SODA
(BY COUNTIES, DOLLAR AMOUNTS
IN THOUSANDS)

County	1969	1973	1974	Minerals Produced, Dollar Value Order, 1974
Atoka	W	W	W	Stone, petroleum
Bryan	2,522	2,231	3,198	Petroleum, natural gas, stone, sand and gravel
Carter	66,645	99,353	188,534	Petroleum, natural gas liquids, natural gas, sand and gravel, stone
Coal	2,426	2,361	4,560	Petroleum, natural gas, stone
Garvin	72,049	79,875	115,230	Petroleum, natural gas liquids, natural gas
Johnston	W	W	4,277	Sand and gravel, stone, petroleum
Love	7,758	6,940	11,792	Petroleum, natural gas, natural gas liquids
Marshall	6,599	5,671	8,944	Petroleum, natural gas liquids, natural gas, stone
Murray	5,176	9,113	11,326	Petroleum, stone, natural gas
Pontotoc	22,334	34,191	60,046	Petroleum, cement, stone, sand and gravel, natural gas, clays, natural gas liquids
SODA Total	185,509	239,735	407,907	
Oklahoma Total	1,090,809	1,323,626	2,123,690	

Source: Bureau of Mines, Minerals Yearbook, Vol. II, Oklahoma Chapter, Table 2 for years indicated.

Note: W = withheld by Bureau of Mines to avoid disclosing individual company confidential data.

petroleum production is the most important regional mineral product, a more detailed analysis is warranted.

Table XII provides a rough idea of absolute and relative magnitudes of SODA petroleum and natural gas production. Carter and Garvin counties consistently produce three-quarters or more of the region's petroleum. However, the total volume of oil produced in SODA reached an absolute low in 1976, in spite of price increases. Regional oil production has become relatively less important from the national viewpoint, declining from 2.3 percent to 1.4 percent of the national level. Table XIII further documents regional petroleum production by chronicling well completions.

Total completions of all wells (oil, gas, and dry holes) declined drastically from a 1954 high of 1,605 to a 1971 low of 197. Thereafter, regional completions have increased at about a 12 percent annual average rate and state completions at about a 14 percent rate. There is a long-term regional trend toward an increasing proportion of dry holes. For example, 23 percent of SODA 1954 completions were dry, whereas 34 percent were dry statewide. These statistics reversed about 1960, and by 1971, 54 percent of SODA completions were dry versus 37 percent statewide. The 1976 figures show some improvement: 42 percent of SODA completions were dry versus 34 percent for the state. However, regional completion figures indicate that exploratory activity is becoming relatively less productive.

An interesting speculation is that increasing worldwide petroleum and natural gas prices might trigger a revival of SODA's petroleum industry. Statistics in Table XII reflect little or no revival from the viewpoint of either petroleum or natural gas production. Census

TABLE XII
 PETROLEUM AND NATURAL GAS PRODUCTION, SODA AND
 UNITED STATES (1955-1976)

Year	SODA		UNITED STATES		Relative Volumes	
	Petroleum (mil- lions of 42 gallon barrels)	Natural Gas (MCF)	Petroleum (mil- lions of 42 gallon barrels)	Natural Gas (MCF)	SODA Petro U.S. Petro (%)	SODA Gas U.S. Gas (%)
1955	56.30	364,870	2,484	9,405,351	2.3	3.8
1956	60.31	450,770	2,617	10,081,923	2.3	4.4
1957	57.93	438,490	2,617	10,680,258	2.2	4.1
1958	48.67	426,320	2,449	11,030,298	2.0	3.8
1959	46.21	445,640	2,575	12,046,115	1.8	3.6
1960	42.40	303,000	2,575	12,771,038	1.7	2.3
1961	41.36	316,560	2,621	13,254,025	1.6	2.3
1962	41.43	380,810	2,676	13,876,622	1.6	2.7
1963	44.45	334,960	2,753	14,746,663	1.6	2.2
1964	40.56	348,190	2,805	15,546,592	1.4	2.2
1965	42.41	381,530	2,849	16,039,753	1.5	2.3
1966	43.66	372,400	3,028	17,206,628	1.4	2.1
1967	47.27	386,500	3,216	18,171,325	1.5	2.1
1968	45.73	470,730	3,329	19,322,400	1.4	2.4
1969	47.25	523,730	3,372	20,698,240	1.4	2.5
1970	48.63	684,470	3,517	21,926,642	1.4	3.1
1971	50.40	456,136	3,454	22,493,012	1.5	2.0
1972	49.86	432,580	3,455	22,531,698	1.4	1.9
1973	49.50	383,117	3,361	22,647,549	1.5	1.7
1974	46.75	351,028	3,203	20,713,000	1.5	1.7
1975	42.45	338,640	3,057	19,185,000	1.4	1.8
1976	38.87	341,243	--	19,800,000	-	1.7

Source: (SODA) Oklahoma Tax Commission File, "Petroleum and Natural Gas Production on which Gross Production Tax was Paid" for calendar year indicated.

(United States) U.S. Bureau of Mines, Minerals Yearbook, 1955-1973, Vol. II, Table 4; 1974-1976, Gerald M. Lage, A Profile of Oklahoma, Frontiers of Science Foundation, 1977, Table 6-6, p. 72 and Table 6-7, p. 74.

TABLE XIII
WELLS COMPLETED,
SODA & STATE

Year	R,S	Oil (percent)	Gas (percent)	Dry Holes (percent)	Total (Number)
1954	R	74	3	23	1605
	S	62	4	34	8786
1958	R	61	2	37	635
	S	56	6	38	6049
1960	R	64	2	34	506
	S	64	8	28	5262
1962	R	66	4	30	471
	S	60	10	30	4556
1964	R	53	5	42	510
	S	56	11	33	4006
1966	R	55	3	42	416
	S	49	16	35	3732
1968	R	48	4	48	310
	S	48	14	38	2739
1970	R	54	3	43	265
	S	50	12	38	2649
1971	R	46	nil	54	197
	S	52	11	37	2255
1972	R	49	1	50	245
	S	45	15	40	2300
1973	R	59	4	37	249
	S	39	24	37	2281
1974	R	59	2	39	260
	S	38	24	38	3057
1975	R	62	4	34	328
	S	48	17	35	3646
1976	R	54	4	42	335
	S	47	19	34	4216

Source: U.S. Bureau of Mines, Minerals Yearbook, 1954-1974, Vol. II, Oklahoma Chapter, Table 5; 1975-1976, Data obtained from U.S. Bureau of Mines, Oklahoma City.

Notes: R = region, S = state

TABLE XIV
 MINING EMPLOYMENT RELATIVE TO
 TOTAL REGIONAL EMPLOYMENT

County	Y e a r		
	1950	1960 (percent)	1970
Atoka	nil	nil	nil
Bryan	nil	0.1	0.1
Carter	3.3	3.6	2.2
Coal	0.1	nil	nil
Garvin	2.3	3.0	2.0
Johnston	0.1	0.1	0.2
Love	nil	0.1	0.1
Marshall	0.4	0.2	0.1
Murray	0.5	0.5	0.3
Pontotoc	1.5	0.1	0.5
Region	8.5	8.9	5.7

Source: U.S. Bureau of the Census, U.S. Census of Population, 1960 Detailed Characteristics Report PC (1)-ID, Table 211; 1970 U.S. Summary Report PC(1)-C1, Table 103.

Note: Nil = less than 0.1 percent

TABLE XV
RELATIVE COVERED EMPLOYMENT BY MAJOR
INDUSTRY FOR SODA COUNTIES

Major Industry	Y e a r				
	1972	1973	1974	1975	1976
	(percent)				
Mining	7.7	6.7	7.3	7.6	7.4
Construction	5.9	5.7	5.0	5.0	4.5
Manufacturing	24.6	27.8	28.3	24.5	26.6
Public Utilities	5.0	4.9	5.3	5.6	5.5
Trade	26.6	25.6	25.3	27.7	26.9
Finance, Ins, Real Estate	4.3	4.2	4.2	4.0	3.9
Service	13.9	13.1	12.8	13.7	13.0
Other	12.0	12.0	11.8	11.9	12.2
Total	100.0	100.0	100.0	100.0	100.0

Source: Oklahoma Employment Security Commission, Research & Planning Division, County Employment and Wage Data, annual editions for respective years supplemented by personal correspondence with Dennis O. Martin, Supervising Labor Market Analyst, dated December 22, 1977.

statistics in Table XIV show that mining is a declining industry from an employment viewpoint. Since census data is almost a decade old, Table XV presents a more current view of relative SODA employment by major industrial sector. The data in Table XIV is not comparable with the data in Table XV, however.⁴

The declining proportion of employment in mining reversed in 1973. By 1976, more were employed (2,771) in mining than in any other year shown in Table XV. However, the increase in employment is not dramatic. If regional petroleum resources have actually been depleted, the present flurry of deep well drilling will soon subside; and the dry hole completion rate will once again begin to climb. It is doubtful, in any event, that SODA's petroleum industry will return to the position of economic prominence it occupied in the 1920-1930 boomtown days. A little time may be gained for region planners to investigate other employment producing industries in an orderly fashion.

Summary

A comparison of SODA characteristics with those of Chinitz's provides an intuitive feel for the region's fit to the Model IV designation. For example, the 1970 national median income fell into the \$9,000 to \$9,999 income class (see Figure 7). Forty percent of these limits is \$3,600 and \$3,999. SODA's 1970 median family income fell into the \$5,000 to \$5,999 income class. Thus, regional family income although low, is still somewhat above Chinitz's Model IV criteria.

SODA characteristics approach other of Chinitz's criteria as well. The agriculture subsection indicates that agriculture is a declining sector, in terms of regional employment. A review of education levels

of region residents indicates that they are lower than national levels, and that the gap between regional and national levels is widening. Heavy out-migration has occurred in the past, especially in the working ages. Although more recent indications are that some in-migration is now occurring, it is in the over 30 age brackets. Finally, higher-than-national unemployment rates prevail in all but three of the years reviewed, although admittedly the gap has closed considerably. Thus, the SODA region fits the poor depressed rural area classification rather well.

The growth center policy instituted with the passage of the Public Works and Economic Development Act of 1965 offers hope to residents of such rural areas. Although criticized as a national policy (83) and questioned as to whether or not it was ever implemented in Oklahoma (86, p. 14), Chapter Four investigates the growth center strategy in SODA.

ENDNOTES

¹Symbolically, each dot represents a calculation of the type:

$$\frac{\sum_{16} P_{i,R}}{\sum_{16} P_{i,R}} \bigg/ \frac{\sum_{16} P_{i,us}}{\sum_{16} P_{i,us}}$$

where $P_{i,R}$ is the population in the i th age class for SODA and $P_{i,us}$ is the population of the i th age class for the United States.

²Symbolically, each dot represents a calculation of the type:

$$\frac{\sum_{13} I_{i,R}}{\sum_{13} I_{i,R}} \bigg/ \frac{\sum_{13} I_{i,us}}{\sum_{13} I_{i,us}}$$

where $I_{i,R}$ is the number of families in the i th income class for SODA, and $I_{i,us}$ is the number of families in the i th class for the United States.

³Mathematically, division of each series by the same national price index would have no effect on the information conveyed, because the effect of inflation cancels out. This may be understood by considering one of the points in deflated form. If P denotes the price index for a particular year, then a deflated point symbolically becomes:

$$\frac{\sum_{13} \frac{I_{i,R}/P}{P}}{\sum_{13} \frac{I_{i,R}}{P}} \bigg/ \frac{\sum_{13} \frac{I_{i,us}/P}{P}}{\sum_{13} \frac{I_{i,us}}{P}} = \frac{\frac{1}{P} \sum_{13} I_{i,R}}{\frac{1}{P} \sum_{13} I_{i,R}} \bigg/ \frac{\frac{1}{P} \sum_{13} I_{i,us}}{\frac{1}{P} \sum_{13} I_{i,us}},$$

which is the same as before.

⁴Employment and wage data for workers covered by state unemployment insurance laws are collected and compiled by the Research and Planning Division of the Oklahoma State Employment Service. Employers subject

to state unemployment insurance laws submit quarterly ES-202 (or equivalent) reports containing data on monthly employment and quarterly total and taxable wages. The data are summarized by the state agencies, forwarded to the Bureau of Labor Statistics, and then published quarterly in *Employment and Wages* (84, p. 70). Annual averages appear in the fourth quarter issue. Comparability of the data over time is questionable, because the Federal Unemployment Insurance Tax Act (UI) initially (in 1938) applied only to firms employing at least 8 persons in 20 weeks in a calendar year and excluded many categories of workers, notably federal, state, and local employees. Coverage was extended to federal civilian employees in January, 1955, and to employers employing 4 or more persons in 20 weeks of a calendar year. Coverage was extended again in January, 1972, to firms employing one or more workers. As of 1976, approximately 81 percent of all estimated employed persons were covered by a UI program and, thus, included in the report. Although Oklahoma has its own UI statutes, major federal changes have been adopted about the same time in Oklahoma. However, because of comparability problems, only information from 1972 to 1976 was released.

CHAPTER IV

THE GROWTH CENTER STRATEGY IN SODA: AN EVALUATION

This chapter serves two purposes. First, it demonstrates that SODA administrators have pursued a growth center strategy. Second, the results of a sample survey of employees whose jobs are directly attributable to projects in the SODA area (catalyzed by EDA funds) are presented. The survey seeks to demonstrate the occurrence of two objectives of a growth center's policy: that catalyzed projects in the centers create measurable employment benefits in them and that these projects have measurable employment effects on residents (or former residents) of the district's originally designated RAs.

A Growth Center Strategy Has Been Followed

The evidence in the next two subsections demonstrates that at least a pragmatic growth center policy has been followed in the SODA area since its designation in September, 1966, as an EDD by the EDA under the provisions of the Public Works and Economic Development Act (PL89-136). Two sources of evidence are considered. First, Positive Action Program (PAP) documents prepared by community leaders in each of the designated growth centers are reviewed. Second, several descriptive dimensions of the chronological record of EDA-funded projects are examined. The findings of these two subsections are strong enough to recommend conducting

the full sample survey, the analysis of which becomes the second thrust of this chapter. Consider next, evidence that a growth center strategy has been followed.

Positive Action Program Review

The purpose of the EDA Manual of Economic Development Orders (MEDO 1-28, dated March 11, 1968) is to summarize EDA's strategy concerning growth centers within EDDs. A requirement of this MEDO is that community leaders in each designated growth center prepare Positive Action Program (PAP) documents. The PAPs, among other things, are to outline steps community leaders are willing to take to insure that the unemployed and low-income residents of RAs benefit from a GC's growth (83, D.5). Supposedly GC project proposals were not to receive consideration by EDA until PAPs were submitted. Thus, one way of assessing the commitment of community leaders to the growth center strategy is to examine the growth center's PAP for evidence.

PAP documents for Ada, Ardmore, and Durant were reviewed in their order of preparation, seeking recognition in them of the role the growth center was to play in alleviating economic distress in the RAs. The January, 1969, version of Ada's PAP was reviewed first. The five-page PAP concentrates on setting forth what is or has been done in Ada to promote economic growth. Recognition by Ada leaders of their responsibility toward impoverished outlying areas is indicated by the comment made in conjunction with potential job opportunities at the Solo Cup Company:

When the employment opportunity arises it will be our intention to call on the Neighborhood Youth Corp, the Community Action Program, Oklahoma Employment Service, local

BIA, to make mass mailings and personal contact to individual families where job opportunities are available (69, Ada PAP, p. 2).

A progress and renewal report submitted January, 1971, to update the first PAP, mentions more actions taken benefiting RA residents. However, these actions were not specifically designed by growth center leaders to reach out to RA residents. Several remaining RA problems are listed in the PAP update: the lack of an area vocational-technical education institution and its adult training programs, the need for a multicounty solid waste program, and the need for continued development/expansion of an area Social Services Center (65).

Kenneth L. Deavers (20), Director, Office of Planning and Program Support of the Economic Development Administration, acknowledged receipt of the January, 1971, Ada PAP update in a memorandum dated December, 1971. Deavers, in this memorandum, requests that in the next update Ada community leaders amplify their responsibility toward RA residents and specifically report how commitments to the RA counties, made in the original (January, 1969) PAP, have been carried out. Information about Ada's cooperation with Ardmore and Durant in reducing the SODA's economic problems is also requested.

The update (dated October 19, 1972) was prepared by heads of several Ada agencies, with the assistance of SODA representatives. Cover letters indicate the involvement of James Cook, City Manager; Ted Savage, Chamber of Commerce Manager; Leland Keel, Director of the Chickasaw Housing Authority; J. C. Trease, OEO Manpower Director; and Milton Murphy and Noel Mann of SODA. However, there is little indication that as broad a spectrum of community leadership was involved in the PAP update as was involved in the original PAP.

This update begins with a review of progress on items listed in the original PAP. Specific mention is made of the acquisition of 243 acres 4 miles southeast of Ada for the development of a new industrial park that will be, "especially attractive to rural residents in the growth area, who will be able to reach it without driving through Ada" (64, p. 2). The second section is devoted to the contribution of EDA projects to the district's target population and economy. Although specific figures documenting benefits to RA residents are lacking, this section partially credits EDA funding for 489 new jobs at 5 separate Ada industrial projects. Section four of the update attempts an enumeration of the RA residents working in Ada. Although the figures are admittedly imprecise, it is thought that "2/3 of additional employment or about 350 jobs" (64, p. 4) are filled by RA residents. Section six is addressed to RA residents benefiting from public housing, but no specific mention is made of RA residents occupying them. However, 436 apartment units and/or homes are listed as being made available since 1969. Sections three and eight are devoted to proposed new GC commitments and unsolved RA problems. The lack of an area Vo-Tech facility receives the top priority, and the lack of child care facilities next highest.

The October, 1972, PAP update is the last available. Much stronger emphasis on the role of the Ada growth center in RA and district development is possible, and certainly a more precise enumeration of the effects is desirable. However, this review of the Ada PAP and available updates indicates that Ada leaders are aware of the responsibilities of growth center designation and, over time, have moved to strengthen and reaffirm their commitment to these responsibilities.

The initial Ardmore PAP, dated January 18, 1969, was reviewed next. This PAP, submitted by Gerald Wilkins (the incumbent city manager), is flanked by numerous letters of endorsement from leaders of both private and public Ardmore institutions. The PAP stresses what steps Ardmore has initiated to improve the circumstances of unemployed and under-employed RA residents and also Ardmore's disadvantaged citizens.

Many community projects undertaken in Ardmore at this time were oriented toward accommodating the needs of the Ardmore Uniroyal tire plant, whose location was publicly announced June 21, 1968. An indication of the determination of community leaders to secure the Uniroyal plant is obtained by mentioning four of these projects. First, \$300,000 worth of private funds (including the value of the site given by The Samuel Roberts Noble Foundation) was donated by Ardmore banks and key businessmen to construct the Southern Oklahoma Vocational-Technical Center. Second, Uniroyal was provided with a 300-acre plant site by another \$300,000 quietly collected from utility companies, banks, key individuals, and businesses. Third, the Ardmore Development Foundation floated \$75 million worth of limited liability general obligation bonds to construct the plant. Finally, the Ardmore City Council authorized an election for a multimillion dollar public facility bond issue to finance improvements needed to support the population increase anticipated to result from the Uniroyal plant (69, Ardmore Economic Development Process) (37, pp. 43-46).

Although there is no evidence of updates to the Ardmore PAP, the original PAP indicates an understanding by Ardmore leadership of the role the Ardmore growth center is to play in providing job opportunities for citizens of nearby development areas:

Uniroyal, the City of Ardmore, as well as the Ardmore school system, namely the Vocational-Technical School, have duly executed assurances of job opportunities for the unemployed. It should be indicated that with the advent of an employer of the magnitude of Uniroyal, it will create many job opportunities in this community that previously did not exist. . . . it should be anticipated that many of the presently employed within the area would accept employment with Uniroyal and thus make available job opportunities for these less advantaged. In essence, we believe for the most part a considerable job shift will take place in this area (69, Ardmore PAP, p. 1).

Additionally, the PAP pledged that Ardmore, through the Oklahoma State Employment Service, the Ardmore school system, direct appeal at neighborhood meetings, the normal news media, and other community welfare agencies, would provide information on job and re-training opportunities.

The Durant PAP was reviewed last. Durant's initial PAP was prepared as a prerequisite to an application to EDA for funds to construct municipal water services for a Durant industrial area. The project application date of June, 1968, is assumed to be the PAP date. Area owner-operators of small family farms are identified in the PAP as the group suffering, economically, the most. Their underemployment, thought due to an inability to amass enough capital to expand their agricultural operations to economic-sized units, is a greater problem than unemployment. Additionally, many rural residents possess educational backgrounds inadequate for other employment. The PAP lists the organization of an Equal Employment Opportunity Committee (February, 1968), a program to hire up to 25 youth from poverty-level families, a strong Bryan County Community Action Program, and the establishment of Office of Economic Opportunity (OEO) programs in the area as activities undertaken by Durant to service the disadvantaged segment of the area's population. This PAP, by subjective standards, reflects the smallest degree

of recognition (of the three original PAPs) of a growth center's role with respect to RA residents (67).

A new Durant PAP (68), emphasizing Durant's growth center role, was submitted in September, 1970. Section I, entitled "Economic Relationships Between Growth Center and Redevelopment Areas," stresses that the four counties involved with the Durant growth center (Bryan, Johnston, Atoka, and Coal) have continually been areas of low income, high unemployment, less-than-average educational attainment, high out-migration, and high per capita welfare payments. Section III outlines current Durant programs for the economically distressed. Throughout, the potential benefit to RA counties is stressed. Section IV lists goals Durant has set for itself in its effort to fulfill its growth center role. It is pointed out, for example, that a newly proposed employer of 550 would, if it hired all the Bryan County unemployed, still need an additional 250 employees from RA counties. The Oklahoma Employment Security Commission is considered the agency best able to inform area residents of Durant job opportunities, since their Durant office is responsible for Atoka, Bryan, and Johnston counties. Although the growth center concept is new to the thinking of Durant businessmen and leaders, this PAP emphasizes that they are becoming increasingly aware of growth center responsibilities and are planning to take steps to discharge an even greater amount of their responsibility toward RA counties.

This reading of PAPs for SODA growth centers leaves little doubt that the philosophy of the EDA growth center strategy has been transmitted to businessmen and leaders. Even though the SODA staff and board espouses such a strategy, whether or not one is actually followed depends on the citizens of the centers. Although SODA's authorization is

from federal law (PWEDA), SODA is a planning and development organization and not a law enforcement agency. SODA is an agent of the citizens of its constituent counties, not an agent of the federal or state government. The extent to which leaders in SODA growth centers carry out the growth center strategy thus rests largely with these leaders and not SODA administrators. The purpose of this section is to establish whether or not the growth center PAPs reflect an understanding of the growth center strategy and not the extent to which the strategy has been implemented. This review confirms that sufficient understanding existed.

Descriptive Statistical Analysis of Funded Projects

The PAPs reviewed above indicate that leaders in the growth centers recognized their responsibility toward the impoverished. However, the review does not demonstrate that a GC strategy has been carried out. Although only growth centers were eligible for direct business loans, other communities could file for public works grants. Therefore, whether or not a growth center strategy has actually been followed may be better evidenced by the location, over time, of EDA projects.

Table XVI details projects completed in SODA that have received business loans or public works grants from 1968 to April, 1977. The listed projects either have direct job creating potential or provide infrastructure that facilitates the location of job-creating establishments and/or enhances the quality of life for citizens of the communities involved. Omitted from the list are technical assistance grants

TABLE XVI

COMPLETED PUBLIC WORKS AND BUSINESS
LOAN PROJECTS, SODA REGION

Project Description	Location	Approval Date	Completion Date	EDA Grant/Loan (\$1,000)	Other Public Funds (\$1,000)	Applicant Funds (\$1,000)	Trust Funds (\$1,000)	Private Funds (\$1,000)	Total Cost (\$1,000)	Matching Fund Ratio	
Water plant, tower, lines	Davis	11-1966	1-1969	233		177			410	1.32	
Arbuckle lake pollution prevention	Sulphur	9-1966	2-1968	41	58	99			198	1.00	
Brockway access road	Ada	6-1967	5-1970	113		112			225	1.00	
Retail district parking	Ada	6-1967	1-1973	445		444			889	1.00	
Industrial park storm sewer, streets	Ada	4-1968	9-1969	184		183			367	1.00	
Airpark access road	Ardmore	6-1968	11-1972	487		486			973	1.00	
Water towers, loop water lines	Durant	6-1968	8-1970	417		417			834	1.00	
Sewage collection system	Tishomingo	1-1969	6-1970	87.5		37.5			125	2.33	
Sewage treatment plant	Tishomingo	1-1969	7-1970	108	81	81			270	2.33	
Water plant, tower, lines	Atoka	7-1969	1-1973	553.2	79.5	157.6			790.3	4.00	
Industrial park sewer lines	Atoka	7-1969	1-1973	140	35	70			350	4.00	
					105						
Uniroyal water main loop	Ardmore	7-1969	2-1971	460		460			920	1.00	
Uniroyal access road	Ardmore	7-1969	9-1971	157.5		157.5			315	1.00	
Uniroyal access road	Ardmore	7-1969	12-1971	223		223			446	1.00	
Uniroyal sanitary sewer	Ardmore	7-1969	10-1970	25.5	49.5	75			150	1.00	
Vo-Tech expansion	Ardmore	11-1969	6-1971	425		425			850	1.00	
Eaker field water, access road	Durant	6-1971	4-1972	200	120	80			400	4.00	
Eaker field sewer extension	Durant	6-1971	4-1972	63	94.5	63			315	4.00	
					94.5						
Solo cup	Ada	10-1969	7-1970	500 loan			600	6	1300	2400	0.21
Le Tourneau (now U.S. Motors)	Durant	4-1971	4-1972	2350 loan			700	5.6	1520	4570	0.51
Solo cup expansion	Ada	3-1973	6-1974	733 loan			200	6	400	1333	0.55

Source: Project applications, and Unpublished Inventory of Completed Public Works and Development Loan Projects conducted in April, 1973, SODA Archives. Numerals in pen are specific funds sources: (1) Federal Water Policy Control Administration, (2) Ozarks Regional Commission, (3) Environmental Protection Administration, (4) Federal Water Quality Administration, (5) Bryan County Industrial Authority, and (6) Oklahoma Industrial Finance Authority.

and planning grants (used to finance feasibility studies and underwrite SODA staff activities).

Five dimensions of EDA projects will be computed from Table XVI: the chronological ordering of project completions, the absolute and relative number of project completions, the public works project matching fund ratios, the per capita project costs, and the total dollar value of the projects. Each dimension will be viewed in a growth center/noncenter context. If at least three of the five dimensions favor the growth center strategy, then such a strategy will be deemed, in fact, to have been applied over the time period considered. The temporal concentration of projects in the three SODA growth centers is examined first.

Although the first two projects are not located in growth centers, thereafter projects become increasingly concentrated in the centers. A relative indication is obtained by computing the percentage of completed projects in growth centers for any given year. As can be seen in Table XVII, the proportion increases from zero to 71 percent by 1973, the last year a nonloan project was completed. Moreover, 15 of 21 completed projects are located in growth centers. A GC strategy is thus indicated by both relative and absolute magnitudes.

A combination of private and public funds are usually used to finance projects. If a growth center strategy has been pursued, then a higher ratio of public funds might be expected in growth center projects than in noncenter projects. Several sources of both federal and private funds are evident in Table XVI. For example, federal funds have been made available not only from the EDA, but also the Ozarks Regional Commission (ORC), the Federal Water Policy Control Administration

TABLE XVII
PROPORTION OF COMPLETED PROJECTS
LOCATED IN GROWTH CENTERS

Year	Proportion
1966	0%
1967	50%
1968	71%
1969	65%
1970	65%
1971	70%
1972	70%
1973	71%

Source: Computed from Table XVI.

(FWPCA), the Federal Water Quality Administration (FWQA), and the Environmental Protection Administration (EPA). Private funds have been provided by public trusts, such as the Oklahoma Industrial Finance Authority and the Bryan County Industrial Authority, banks, and applicants. Matching fund ratios for each project are shown in Table XVI (supra, p. 95). A ratio greater than one implies more federal than private funds, whereas a ratio of one implies a 50/50 match. Projects are grouped for analysis purposes into two categories: public works projects and business loans. Public works projects are projects like access roads, water lines, sewers or training structures that facilitate job-creating establishments, whereas business loans are made directly to a job-creating project for building construction and equipment.

Analysis of business loan matching ratios is simplest and will be considered first. Only three completed business loan projects are located in the SODA region and comprise but two separate projects: the U. S. Motors Plant in Durant and the Solo Cup Plant and expansion in Ada. Actually, a center/noncenter comparison of matching ratios for business loan projects is not legitimate. When the loans were approved, the RAs were not eligible for them. Therefore, all business loan projects were placed in growth centers. For the record, EDA loans ranged from 21 percent to 55 percent of total project cost and averaged 43 percent.

Public works projects present a different picture from the matching ratio viewpoint. In the first place, although 18 such projects are listed in Table XVI, only 11 separate projects are represented. For example, all 5 of the 1969 Ardmore projects are related to the installation of the Uniroyal Plant, and all have a ratio of one, indicating a 50/50 match. Of the 11 projects so grouped, 7 are located in growth

centers and 4 in noncenters. The average growth center matching ratio is 1.43, whereas the average noncenter ratio is 2.16. Thus, this indicator favors noncenter public works projects.

Another way of comparing center versus noncenter figures is on a per capita basis. Since intercensal population estimates for all the communities involved are available only since 1970, and then for the growth centers only (45), county population estimates will be substituted. Table XVIII displays the county population estimate, total EDA project cost, and the per capita amount for each year a project was approved. An arithmetic average of the per capita amounts for noncenter versus center counties is shown as a summary figure. As can be seen, the per capita average of \$70.84 favors the noncenter counties slightly, but by only \$5.77.

Total project value is the final dimension considered. From the first project application in 1966 to the last approved and completed project, growth center projects have a total stated application value of \$14,987,000, whereas the noncenter total stated application value is only \$2,143,300. This dimension thus favors the growth center strategy.

Table XIX tallies the results of each previously discussed indicator. Since three of the five indicators favor the growth centers, according to the criteria set out in the beginning, the conclusion is reached that a growth center strategy has been followed.

Annotated Catalog of EDA

Projects in SODA

This section gives qualitative sketches of EDA projects located in SODA. Information for these sketches derives from three sources:

TABLE XVIII

PER CAPITA COMPARISON OF PROJECT COSTS
GROWTH CENTERS VS. NONCENTER COUNTIES

Year Project Approved	Growth Centers				Noncenter			
	County	Population Estimate	Total Cost (\$1000)	Per Capita Cost	County	Population Estimate	Total Cost (\$1000)	Per Capita Cost
1966					Murray	10,500	608.0	\$ 57.90
1967	Pontotoc	27,900	1114.0	\$ 39.93				
1968	Pontotoc	27,800	367.0	13.20				
	Carter	37,500	973.0	25.95				
	Bryan	25,200	834.0	33.10				
1969	Carter	37,400	2681.0	71.68	Johnston	7,900	395.0	50.00
	Pontotoc	27,800	2400.0	86.33	Atoka	10,900	1140.3	104.61
1971	Bryan	25,700	5285.0	205.64				
1973	Pontotoc	29,800	1333.0	44.73				
		Mean		\$ 65.07		Mean		\$70.84

Sources: (Population Estimates) Oklahoma Employment Security Commission Research and Planning Division, Oklahoma Population Estimates 1960-1970 Intercensal Estimates (bulletin dated June, 1975); Oklahoma Population Estimates (bulletin released April, 1975; Other Information--From Table XVI.

TABLE XIX
 SUMMARY OF DESCRIPTIVE STATISTICAL ANALYSIS
 OF FUNDED PROJECTS

Indicator	Outcome Favors	
	Growth Center	Noncenter
1. Chronological order of completed projects	x	
2. Absolute and relative number of completed projects	x	
3. Matching fund ratios (Public works projects)		x
4. Project costs (per capita)		x
5. Total dollar value of projects	x	

Source: Summary of conclusions reached in text.

Milkman's (80)(83) earlier study, visits to firms located on project sites, and project evaluation questionnaires (Appendix B). The sketches provide background for analysis of the employee sample survey (Appendix A), put Milkman's earlier study into current perspective, and permit expression of comments by managerial personnel of firms visited and by other individuals involved in project applications. Additionally, qualitative analysis is more appropriate than quantitative analysis for three projects initiated as "environmental" projects (see Table XVI, Sulphur, Tishomingo, and Ada parking).

The sketches are divided into two subsections: one for growth center projects, and the other for noncenter projects. This study is thus more comprehensive than Milkman's (80)(83), because four of the completed projects considered in this section received no consideration in the earlier study since they are located in noncenter communities.

EDA Growth Center Projects

The geographical location of completed EDA projects is given in Table XVI. In Ada, EDA shared in the building of an access road for an already established glass plant, revamped parking in the downtown retail district, provided water, storm sewers and streets in an industrial park, and helped build a plastic cup manufacturing plant. In Ardmore, EDA funds helped construct an access highway to an industrial park and provided access and utilities to a new tire plant. In Durant, EDA funds were used to increase the capacity of the water system for two industrial sites and to provide utilities and access to one of the sites. A gear drive manufacturing plant was also constructed. These projects form the core for evaluating the growth center strategy in SODA's three

centers. Since this analysis attempts to be comparable with The Economic Development Administration Growth Center Strategy (80)(83), a study of the same three growth centers conducted in December, 1970, their definition of attributable jobs will be used; i.e., "those jobs created or saved as a direct result of the project" (83, A-4). In this earlier study, no job credit was given to an establishment that was already operating or completed before approval of the EDA project, unless authoritative evidence could be found to the contrary.

Permanent Job Creation in Ada. Table XX lists Ada's completed and operating firms located on job-creating EDA projects. In addition, the Chickasaw Tribe was beginning to construct a futuristic tribal headquarters building on the corner of Arlington and Broadway (Figure 9). However, EDA cannot be credited with the location of all of these firms, as will be seen.

Milkman's 1970 evaluation acknowledged that the access road is a potentially valuable asset. However, no jobs were attributed to it. At the time, Brockway Glass was the only firm located on the road; but it was not counted because its plant expansion was completed in 1967, the year the Ada City Council authorized participation in the access road project. The earlier researchers found that:

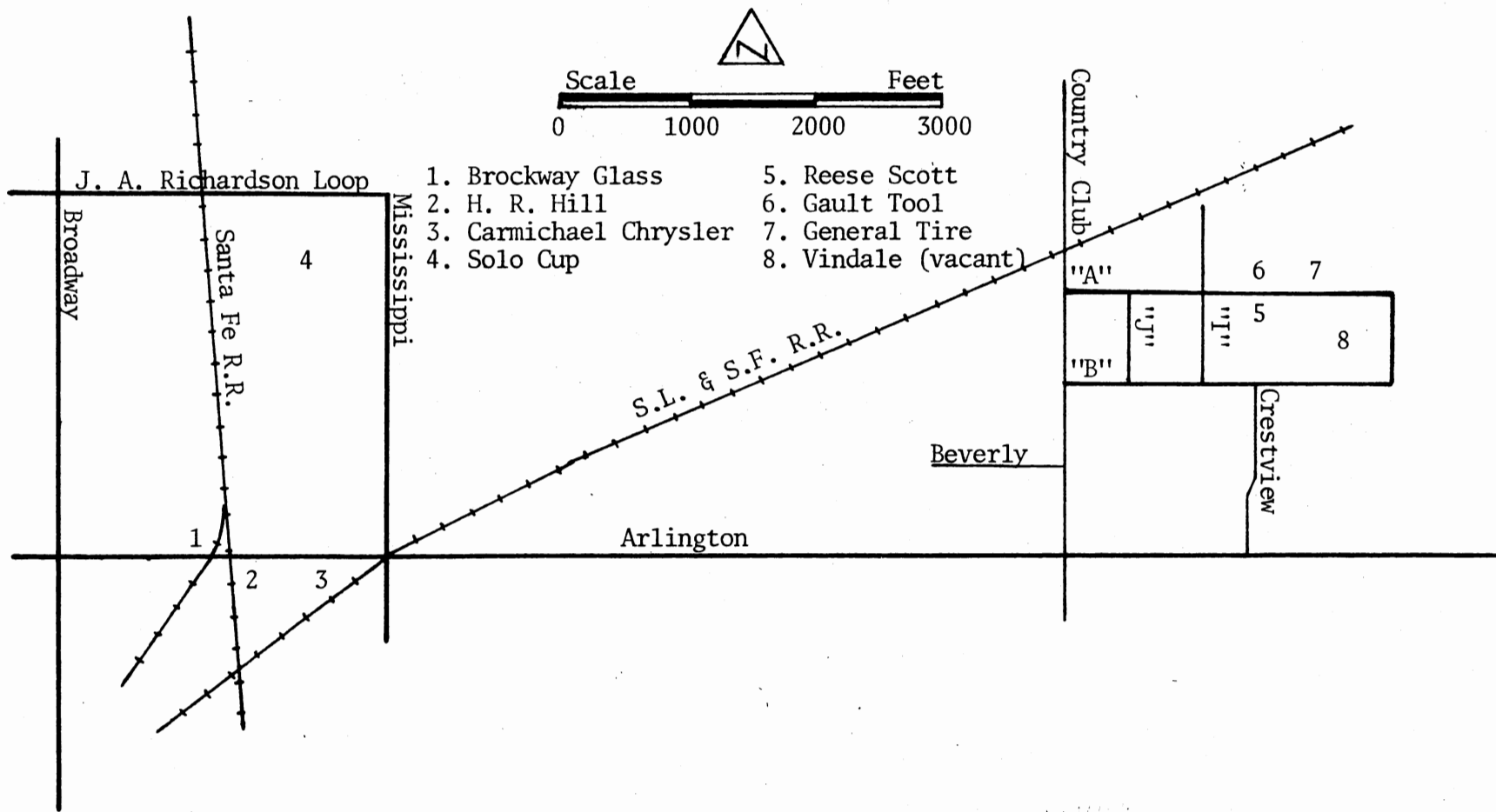
As a result of its expansion program, Brockway now employs 347 people, 97 more than in 1967. Since Brockway's cost of expansion was close to \$10 million, it was not felt that EDA's \$113,000 investment could be considered critical to keeping the company in the area (80, p. 2-25).

Not even the 97 expansion jobs were considered project attributable. A conversation with Bob Franklin, Brockway's present plant manager, and Lloyd Hatley, the personnel manager, in mid-1976, verified this

TABLE XX
 COMPLETED JOB-CREATING FIRMS LOCATING
 ON ADA EDA-SPONSORED PROJECTS

Firm's Name	Address	Year Located	Type of Business
Access Road			
Brockway Glass	300 E. Arlington	Major expansion completed 1967	Glass container manufacturing
H. R. Hill	401 E. Arlington	1971	Public trucking
Carmichael Chrysler	515 E. Arlington	1972	Auto retailer
Industrial Park			
Blue Bell, Inc.	Indus. Park	1956	Wrangler jeans
OG&E	Indus. Park	1959	Dist Hq Power Utility
Gualt Tool	Indus. Park	Original 1963 expansion 1976	Earthaugers and oil field tools
Remington Arms	Indus. Park	1967	Clay targets
Reese Scott	Indus. Park	1970	Church furniture
General Tire	Indus. Park	1973	Molded rubber products
Sach Building	Indus. Park	1974	Building contractor's office
Professional Fiberglass	Indus. Park	1975	Fiberglass storm cellers
Business Loan			
Solo Cup	401 N.E. J. A. Richardson	Orig 1971, Exp 1973	Plastic cups

Sources: Minutes of the Ada Industrial Development Corporation; Establishment visits, 1976-1977.



Source: Map of Ada prepared by the Ada Chamber of Commerce, May, 1975.

Figure 9. Location of Ada Firms

conclusion. However, as before, Brockway declined to participate in the study.

Ted Savage, Manager of the Ada Chamber of Commerce (and manager at the time access road negotiations were undertaken), objects to the conclusion reached by the earlier researchers. He points out that the Brockway plant was under different management in 1966 and clearly recalls a meeting with the previous manager, Mr. Cooper. A paved, four-lane access road without the then existing railroad underpass was verbally made a prerequisite to Brockway's expansion or even remaining in Ada. Upon a gentlemen's agreement between Cooper and Savage, Brockway undertook its expansion; and Savage began a protracted search for access road funds.

Although one can only speculate as to how serious was Brockway's threat to leave Ada, there is no doubt that the glass plant continues to be an important Ada employer. On the basis of Savage's comments, it was decided that Milkman's 1970 conclusions should be modified and that 97 expansion jobs should have been previously counted (the difference between the 1967 employment level of 250 and the 1970 level of 347). Similar logic infers that 180 expansion jobs should be counted in 1976 (the difference between the 1967 level of 250 and the 430 level listed for Brockway on the February, 1976, Oklahoma State Department of Industrial Development Community Data report). The figures included in Table XXI (page 113) reflect these computations. The location of Hill Trucking is related to Brockway's decision to stay in Ada and, thus, will be considered next.

H. R. Hill Trucking located along the access road about November, 1971. Although Hill is a licensed public carrier, it is primarily

engaged in transporting the Brockway plant output. In fact, Brockway deeded the land on which Hill is located to the Ada Industrial Development Corporation (AIDC), and Hill then bought the four-acre tract from AIDC.

Hill was only a three tractor-trailer floating operation before Brockway made its decision to stay in Ada and expand. No mention of Hill was made by the previous researchers. At the time, it would have been difficult to identify Hill as a separate entity because its trailer parking space was across town and its administrative requirements were handled out of the Muskogee headquarters. By the time the mid-1976 visit was made, a permanent terminal had been constructed, 14 tractors and 50 trailers were in operation, and administrative functions for the dozen employees were being handled out of the Ada terminal. Additionally, an expansion of approximately 20 percent is scheduled to add three more employees within the year. Conservatively, another dozen jobs can be attributed to the access road.

Hill is unique among the firms visited in one sense. It is the only example of a spinoff industry found. Spinoff industries owe their existence to a primary industry. Although Brockway is probably not dynamic enough to be considered a "key" or "propulsive" firm (supra, p. 15), spinoffs, such as Hill, can still develop and are important suppliers of items (in this case, transportation services) to the primary industry.

The location of Carmichael Toyota-Chrysler-Plymouth (Carmichael Chrysler henceforth) and the completion of the Ada retail parking project in 1973 are interrelated, so both can be considered in the same discussion. EDA refused to release the final portion of the parking

project grant until the project was complete. However, Charmichael Chrysler leased a building that occupied the last third of the fourth lot and refused to relocate until its lease expired. Relocation along the Brockway access road was finally accomplished about August, 1972. Since Charmichael Chrysler was an established Ada firm whose new location is more the loss of a former location than a direct result of the road, no jobs would be attributable to the auto retailer.

No evaluation of the EDA-sponsored Ada downtown parking project was made by the earlier researchers, allegedly because it had not been completed (80, p. 2-25). Now that the project is complete, evaluation from a job-creation viewpoint seems inappropriate because its main purpose was to improve the quality of life of Ada residents. EDA funding of such "environmental" projects is part of the original growth center strategy (83, Appendix D). Paragraphs three and four of the introduction to the parking project proposal clearly state that the quality of life aspects of the project were considered paramount:

This project is basically an environmental program. It must be recognized as the first such environmental program in the first Development Center in the first locally initiated Economic Development District to be officially designated by the Economic Development Administration.

Since there is no precedent for this type project, it must be evaluated upon its potentials to accomplish two primary objectives. . . . (a) to strengthen the wholesale and retail activity . . . and (b) to improve the economic and social environment in such a way that it will assist in the attraction and development of economic activity by making the area a better place in which to live and work (70, p. 1).

Since this study concentrates on permanent job creation, further consideration of the parking project will be dismissed.

The Ada industrial park utilities project bears a 1968 approval date and will be considered next. The essence of this project, whose

total cost is listed at \$367,000, is the paving and sewerage of two streets in the Industrial Park area north of Arlington Shopping Center and west of Country Club Road. The two streets are designated simply "A" and "B" (Figure 9, *supra*, p. 105). A 12-inch water line was included to boost water capacity.

The earlier evaluators were critical of the job impact of the Ada Industrial Park. They found:

. . . that no significant expansion had taken place; . . . that one firm found it necessary to temporarily lay off 12 employees pending improvement in its cash flow, and though providing employment opportunities for residents of Ada, the projects had little effect on RA residents (80, p. 2-26).

Only one new firm, Vindale Mobile Homes, had moved into the park. Vindale was employing 60 persons at the time of the evaluator's visit (March 31-April 9, 1971) to SODA.

Industrial park firms have had and are having their ups and downs. For example, Vindale was completely closed during the 1976-1977 visits, leaving vacant four buildings newly constructed in 1970 having 109,500 square feet of combined floor space. Thus, the only jobs the earlier evaluators felt were attributable to the park project have been completely wiped out.

Several of the Industrial Park firms in Table XX were located in the park and/or use facilities constructed prior to the EDA project. Unless a post-project expansion has been facilitated, jobs created by these firms would not be project attributable. Blue Bell, OG&E, Gault Tool's original plant, and Remington Arms are in this category. Professional Fiberglass is also in this category, because it uses only part of one of two buildings vacated by Forester Manufacturing (the oldest facilities in the park and in existence long before passage of

PWEDA). The previous study correctly excluded jobs and facilities of these firms.

Gault Tool underwent a project attributable plant expansion in 1976. Gault is also notable because it received a \$3,000 Area Redevelopment Administration Grant when it located in the park in 1963. Gault reported a total of 14 employees in the 1970, 1972, and 1974 Oklahoma Directory of Manufacturers (46), but this has been increased to 21 employees in the 1976 edition. Therefore, seven employees added as a result of the expansion may be attributed to the park project.

Reese Scott is one of the new firms in the park. Scott began his business in meager facilities in Roff, Oklahoma, a small community 15 miles southwest of Ada, in 1957. By 1970, Scott was looking for a new location and construction financing. Ada bankers offered the financing. Ada was close enough to Roff for Scott to retain his original employees. Moreover, the Industrial Park was equipped with water lines that would permit his furniture factory eventually to be sprinklered. Ada was thus the logical location. However, Scott could not afford to install the sprinkler system at the time the plant was built, and the installation had been completed only shortly before the plant was visited for this study.

Scott offers an opportunity to comment on the utility of the industrial capacity water system installed in the park. High pressure capacity is not needed for manufacturing, because day-to-day water usage by the park's firms is mostly for restroom purposes. It is needed, however, to operate sprinkler systems in fire emergencies. In Scott's case, the annual fire insurance premium, for the same level of coverage, is expected to drop from \$4,000 to \$2,000 per annum as a result of the

installation of the sprinkler system. Scott is listed in the 1970 Oklahoma Directory of Manufacturers (46) in Roff with six employees, although the move to Ada was made the same year. Twelve were employed when the Scott plant visit was made, so six Scott employees are project attributable.

General Tire is an Industrial Park firm whose project-attributable jobs raise some questions. General's building was originally constructed for Kilpatrick Brothers Manufacturing Company (56), whose lease became effective September, 1967. The facilities had been constructed with funds from \$450,000 in revenue bonds issued by the Pontotoc County Industrial Development Authority (a public trust) and \$1,260,000 in General Obligation Industrial Development Bonds (issued by Pontotoc County). The Kilpatrick lease agreement called for \$11,937 in monthly payments over a 20-year period, with a purchase option at the end and was a typical industrial financing arrangement. However, Kilpatrick closed and even ceased making lease payments in June, 1971. This plant was thus probably unoccupied when the earlier evaluators visited. The facilities remained vacant until General Tire and Rubber of Ohio signed a five-year lease in November, 1972. Equipment was moved in and manufacturing begun in April, 1973.

Bob Dombkowski (the plant's Industrial Relations Manager) was General's spokesman during the plant visit. Since the Marathon facilities in Durant were available at the time General was searching for a site, and were similar in size, Dombkowski was asked why the decision was made to locate in Ada rather than Durant. His reply was that Durant was considered, but that the building was equipped with machine tools General could not use, whereas the Ada building was entirely vacant and

ready for occupancy. General is also planning for the future, because the adjoining 20-acre tract has been purchased. After considering these facts, it was decided that the plant's 187 jobs were project attributable.

Sach Building is the last Industrial Park firm to be discussed. Sach is an erector of Butler prefabricated buildings. It has a storage yard and small office on the corner of "A" street and Country Club Road. Although a new firm, its requirements could have been met by numerous other Ada locations. Since it is not a manufacturing firm and has no need of sprinklered facilities, Sach was ruled not attributable.

Solo Cup is the receipt of two EDA direct business loans. A \$500,000 loan was part of the original \$2,400,000 construction package. In March, 1973, a second direct loan for \$733,000 became part of a \$1,333,000 Solo expansion. The earlier evaluators attributed 165 jobs to Solo (80, p. 2-26). According to Jack Allen, Solo's plant manager, 306 people were employed at the time the March, 1977, plant visit was made. No other employee information was made available to either the previous researchers or this researcher, although Solo jobs are decidedly project attributable.

Table XXI contrasts results of the previous study with the present, adding appropriate Brockway expansion jobs to each. Even with the loss of Vindale, a net increase of 376 jobs is attributable to the Ada EDA projects.

Although only Hill indicated modest imminent expansion plans, room for expansion is included not only in Hill's location, but also Solo Cup and General Tire. Vindale, now vacant, is seemingly readily adaptable to many types of manufacturing and has complete rail and truck

TABLE XXI
 ADA JOBS ATTRIBUTED TO EDA PROJECTS
 IN 1970 AND 1977

Firm's Name	1970 Study	1977 Study
Brockway Glass	97*,**	180**
H. R. Hill	not constructed	12**
Solo Cup	165***	306
Gault Tool	expansion not constructed	7**
General Tire	plant vacant	187
Reese Scott	not constructed	6**
Vindale Mfg	60***	0
Totals	322	698

Sources: (1970) U.S. Department of Commerce, Economic Development Administration. Detailed Case Studies: Supporting Documentation for the EDA Growth Center Evaluation. U.S.D.C., February, 1972.

(1977) Compiled from sketches in text.

Notes: *Brockway was not counted in the 1970 study but should have been. See text for explanation.

**Firm existed before EDA project began; thus, only expansion jobs have been counted.

***As stated in 1970 study.

facilities on site. Thus Ada EDA projects and firms located thereon are well prepared for expansion.

Permanent Job Creation in Ardmore. The evaluators in 1970 (80) found the Airpark access road and the Uniroyal Plant incomplete and thus evaluated none of the Ardmore projects. A check of project completion dates (Table XVI, supra, p. 95) substantiates their conclusion. Although projects are now complete, detailed information on firms is again unavailable. Thus, comments about Ardmore projects are less complete than Ada and Durant projects.

Focus first upon the Airpark access road (reference Table XVI for project statistics). Noel Mann (74), a principal writer of the original proposal, also wrote a summary of the project as part of the 1973 project inventory. The need for this road can be better understood by looking at Figure 10 in conjunction with Noel Mann's (74) comments:

The Ardmore Industrial Airpark is located approximately six miles east of I-35 and U.S. 77. State highway 53 runs from these two highways past the Industrial Park and on south one mile to Gene Autry, where it terminates. (The access road) replaces a county road and U.S. Corps of Engineers Army Surplus bridge from the Airpark to U.S. 177. The project was to provide a safe and quick access to workers living east of the Airpark in Pontotoc, Johnston, Marshall, Garvin, and portions of Carter County.

Moreover, the project impact statement claims that "there are approximately 1,000 industrial jobs at the Airpark" (74). A noontime sidetrip across the old Army Surplus Bailey bridge quickly verified the need for a new bridge. Conversation with Noel Mann further clarified the comments contained in his inventory statement. Basically, the thinking behind the project was that a new, safe, high-speed rear entrance to the Airpark would make the journey to Airpark jobs more feasible for

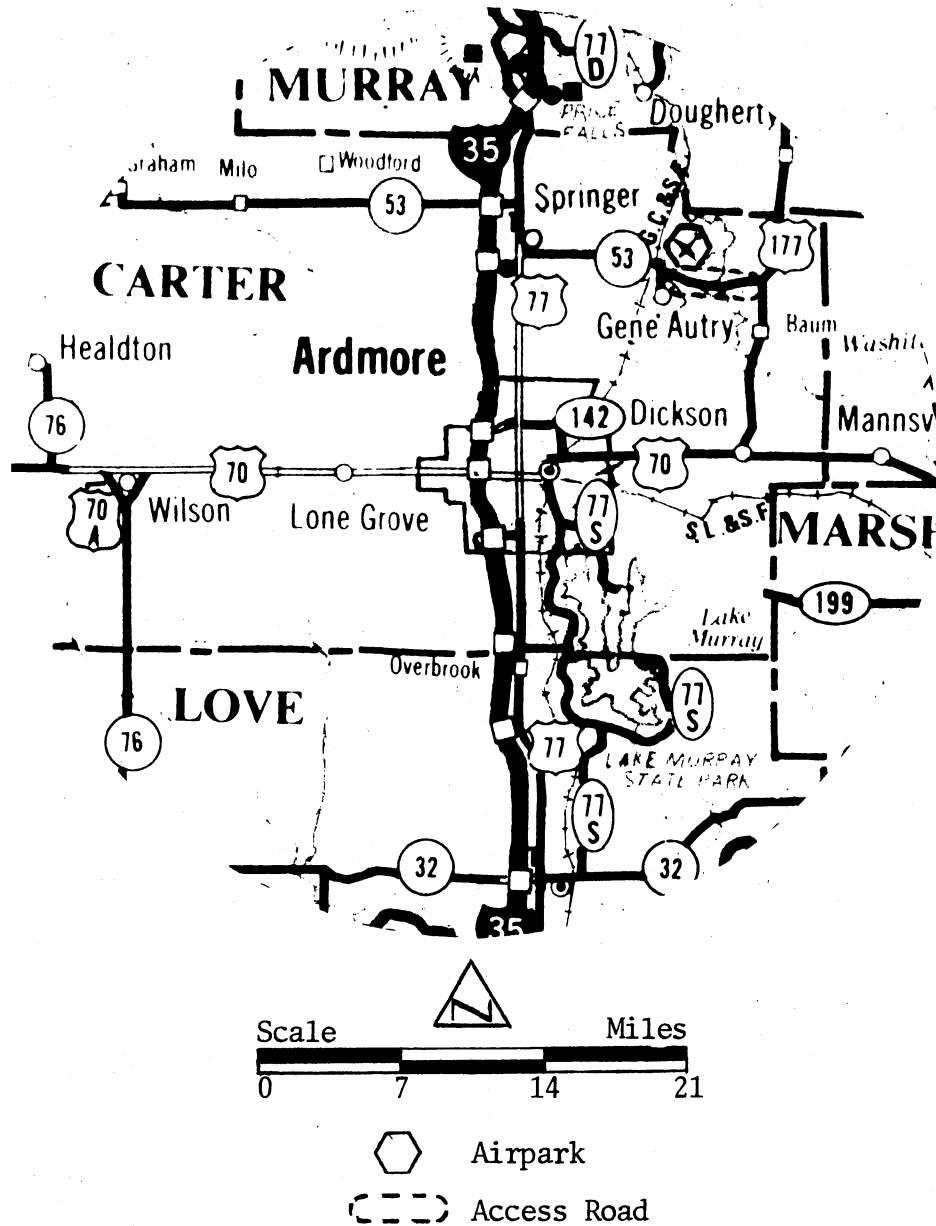


Figure 10. Airpark Access Road

residents in the town of Sulphur and hopefully the eastern edge of Johnston County. Thus, two facets of permanent job creation are relevant for this project:

1. The number of jobs created or saved
2. Whether or not a situs shift in the Airpark workforce has occurred so that a greater proportion of the workforce is now coming from communities to the Airpark's east.

Table XXII provides a composite of Airpark employment for 1973 and 1977. Only three small employers have located in the Airpark since completion of the access road, and total employment is considerably below its 1973 level. The small gain of their 15 jobs is more than offset by the loss of Jet Aero Services, the SAE Corporation, and the Stromberg-Carlson layoffs. One of the three, RC&D, is the USDA Soil Conservation Service Resource Conservation and Development Office located in the same building as SODA. This office works so closely with SODA that considering it separated is questionable. Moreover, both SODA and RC&D are moving into Ardmore. Thus, the initial impression is that the access road is presently doing little to create or save Airpark jobs. Perhaps a more definitive statement can be made about the residential situs of the Airpark labor force.

The Ardmore Development Authority has conducted two commuting labor surveys: one July, 1973, and the other April, 1976.¹ Airpark commuting information was obtained at the same time (5)(6). Fortunately, the 1973 survey was conducted only seven months after completion of the access road. The surveys were conducted by sending Ardmore manufacturers, processors, and distributors a memorandum asking them to mark and return an attached survey form with the number of employees from Ardmore and area

TABLE XXII
 ARDMORE AIRPARK EMPLOYERS
 AND EMPLOYMENT

Firm Name	Status*	Major Product	Employment	
			1973	1977
American Flyers, Inc.	1960	Flight training school	70	52
Aztec Development, Inc.	1974	House frames & trusses	0	9
Basic Glass, Inc.	1976	Glass tubing	0	4
Beetle Plastics, Inc.	1971	Fiberglass components	51	86
FAA Tower	1957	Air traffic control	11	15
Jet Aero Services	closed	Jet aircraft maintenance	53	0
U.S.D.A. RC&D	1975	Resource conservation and development	0	2
SAE Corporation	closed	Surface materials	5	0
SODA	1966	Areawide development planning	13	14
Stromberg-Carlson	1964	Telephone communication equipment	800	525
Totals			1003	707

Sources: (1973) Ardmore Development Authority: Ardmore Industrial Directory, September 1973; Southern Oklahoma Development Association: Contact, May, 1973; Telephone Conversation with Federal Aviation Administration (FAA) Tower, March, 1977.

(1977) Ardmore Development Authority: Ardmore Industrial Directory, January, 1977; Ardmore Industrial Airpark Directory, April, 1976; Southern Oklahoma Development Association: Newsletter January/February, 1977; Telephone conversation with Federal Aviation Administration (FAA) Tower, March, 1977.

Note: *If firm was still operating in 1977, the year it located in the Airpark is given.

towns (towns were listed, but provisions were made to write in other towns).² Participants were promised that they would not be individually identified and that only a combined total of all firms would be published for distribution (8).

Johnston is the only RA county in which Airpark employees reside. Table XXIII helps describe the difference between 1973 and 1976 Johnston County employment. An underlying assumption is that a shift favoring the RA counties is primarily due to the new access road. Using figures from Table XXIII, the hypothesis that the 1976 Johnston County employment is significantly greater, proportionately, than the corresponding 1973 figure, was tested. The difference (using a one-tailed hypothesis test) is significant at the 5 percent level. However, a similar test (lumping together all employees commuting from towns along or to the east of U.S. 177) fails to indicate a significant difference at any respectable significant level. Although total and even Johnston County employment at Ardmore Airpark is down, Johnston County still accounted for a statistically significant increased share of Airpark employment. Thus, the Airpark may be ailing in the job creation category, but it is still a source of RA jobs. Presumably, the new access road is capable of making commuting from Johnston County more feasible; and, thus, this EDA project is performing the function for which it was intended. All that needs to be done is to entice more employers into readily usable vacant facilities.

The location of the Uniroyal tire plant is, at the same time, a portrait of teamwork and an example of how fate sometimes plays an important role. SODA obtained a \$22,000 Technical Assistance (TA) grant in 1967 to study the feasibility of locating industrial

TABLE XXIII
 ARDMORE INDUSTRIAL AIRPARK COMMUTING
 LABOR SURVEY COMPARISON
 1973-1976

Residence	Survey Date			
	July, 1973		April, 1976	
	No.	Percent	No.	Percent
Johnston County	72	7.9	63	9.7*
Along & East of U.S. 177	212	23.3	145	22.4
Survey totals	911	100.0	648	100.0

Source: Ardmore Development Authority. Geographic Breakdowns by Community of Commuting Labor Force, Ardmore Industrial Airpark, July, 1973, and April, 1976. Participants: (1973) American Flyers, Ardmore Homes, Beetle Plastics, Stromberg-Carlson, Ryder; (1976) American Flyers, Aztec Development, Beetle Plastics, FAA Tower, SODA, RC&D, Stromberg-Carlson.

Note: *1976 Johnston County Airpark employment percent significantly greater than 1973 percent at 5% level.

warehouse facilities in the region. The Fantus Company was engaged to do the study. Uniroyal also engaged the Fantus Company to study locations for a new tire plant. Thus, fate brought the two together, because Fantus recommended Ardmore to Uniroyal, but only after running the Ardmore Development Authority's industrial team through a crash data gathering exercise. The fascinating story of a small community landing the biggest plant in Oklahoma (in terms of employment) south of Oklahoma City is well documented by James McGoodwin (37) in A Study of the Anticipated Economic Changes in Carter County Resulting From the Installation of the Uniroyal Facility at Ardmore.

SODA's part in helping the plant locate is documented in Table XVI. All five EDA funded Ardmore projects used Uniroyal as their justification. The permanent employment impact is also easy to document. The Ardmore Industrial Directory (4) lists 1,606 employees, a figure verified by Uniroyal Industrial Relations Manager, Ed Estus. Thus, 1,606 jobs are attributable in 1977 to the same Ardmore projects which received no credit in the earlier study. Uniroyal rules neither allow their employees to be bothered or solicited nor allow plant operating information to be divulged. Nevertheless, the study proposal was presented and forwarded through corporate channels, whereupon the rules were reaffirmed. Unless legally required, Uniroyal desires plant information to remain secure and the privacy of their employees to be respected. Only information contained in public records may be used. Unfortunately, Uniroyal is the only Ardmore firm directly attributable to EDA funds. Moreover, public records do not break Uniroyal out separately from other Ardmore industries. Therefore, Ardmore cannot validly be represented

in the analysis of survey data; and, therefore, inferences may be drawn for Ada and Durant evaluated firms only.

Permanent Job Creation in Durant. The earliest Durant EDA project is the 1968 water system project. This \$834,000 project (one-half of which was provided by an EDA public works grant; see Table XVI) constructed a riverside pump station, a coagulation and sedimentation tank, a chemical feed building, and water distribution mains of various sizes (80, p. 2-28). Milkman's 1970 study attributed 50 jobs to this project.

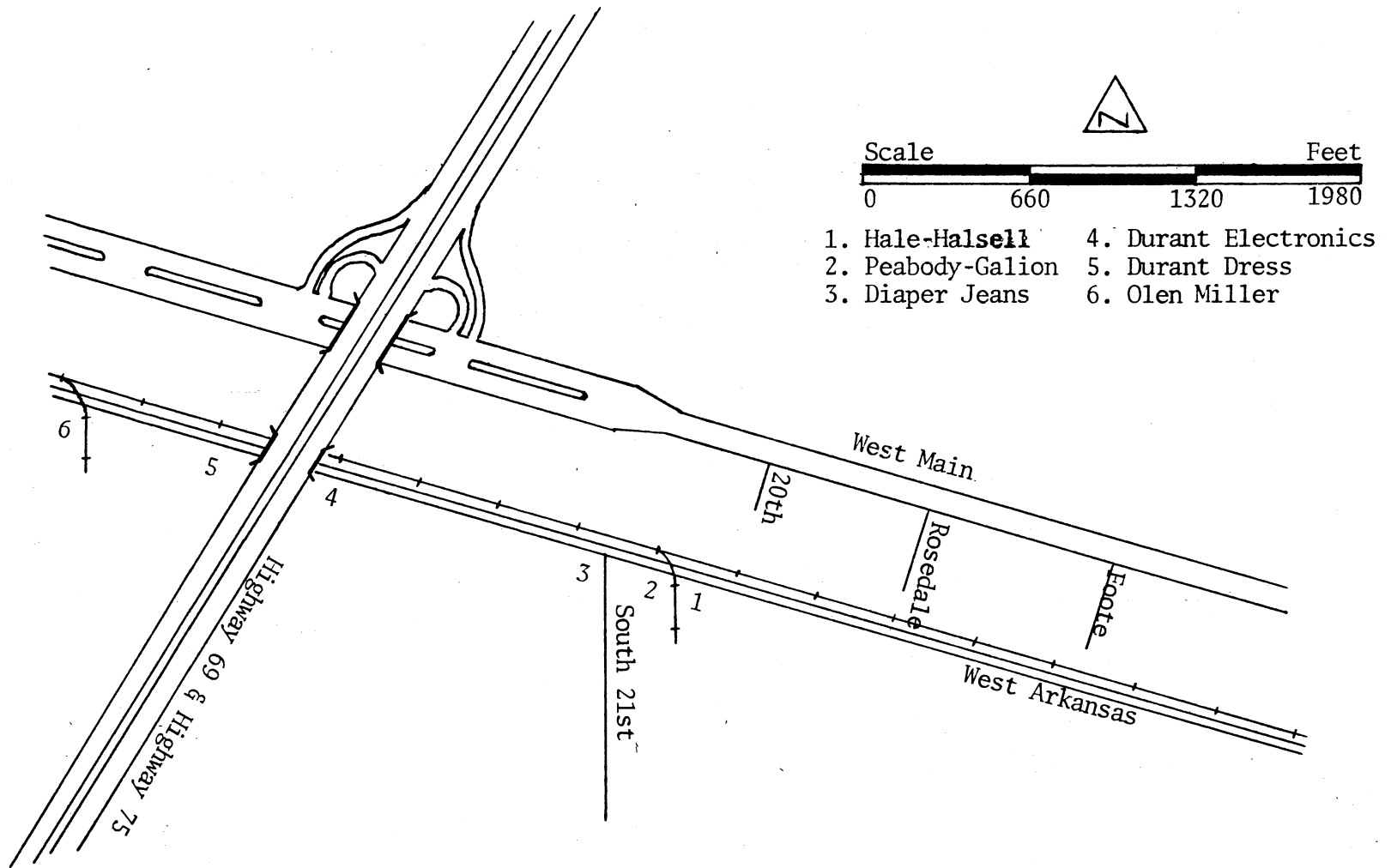
The main beneficiaries of the project, in addition to residential users in the northwest part of town, are industrial users on the south side of Arkansas Street. Table XXIV enumerates the job-creating firms located along the south side of West Arkansas (the Frisco railroad main line runs the full length of the north side). Three of the firms in this table were mentioned in the earlier study (80, pp. 2-28 to 2-31): Hale-Halsell (listed as a warehouse and trucking firm), Peabody-Galion, and Durant Electronics. Visits to these firms in 1976-1977 provide interesting contrasts with the conclusions reached in the previous study.

Hale-Halsell is a wholesale supplier of groceries and produce to independent grocers in southeastern Oklahoma, distributing food products arriving by rail and truck to grocers on its own truck fleet (Figure 11). The earlier study attributed no Hale-Halsell jobs to the water project. Contact with Bill Dufer, manager, revealed that the conclusion reached by the earlier researchers is correct; and theirs is the view taken here, too. Hale-Halsell opened its present location in 1953, well before the Arkansas Street water project was begun. Water is used only for restroom purposes and not manufacturing. However, Bill Dufer explained

TABLE XXIV
 COMPLETED JOB-CREATING FIRMS LOCATED ALONG
 ARKANSAS (WEST OF NINTH STREET)

Firm's Name	Address	Year Located	Type of Business
Hale Halsell	1800 W. Ark	1953	wholesale grocery distributor
Peabody-Galion	1835 W. Ark	1971	mfg trash & dump truck bodies
Diaper Jeans (originally Linda Dress)	2100 W. Ark	1975	mfg pre-teen garments
Durant Electronics	2200 W. Ark	1965	mfg injection molded plastic toys
Durant Dress Co.	2301 W. Ark	1976	mfg ladies garments
Olen Miller & Sons, Inc.	2901 W. Ark.	1974	wholesale distributor Coors beer

Source: Establishment visits, 1976-1977.



Source: Map of Durant Prepared by Durant Chamber of Commerce.

Figure 11. Durant Arkansas Street Firms

that Hale-Halsell does directly benefit from the water project in one way.

Arkansas Street water pressure was inadequate for fire insurance standards before construction of the new mains. In fact, insurance agents had suggested that Hale-Halsell construct its own storage tank, which would be an unnecessary expense if the city were to construct capacity needed anyway to accommodate Durant's future industrial growth.

The Peabody-Galion plant is immediately west of Hale-Halsell. Peabody has been located in Durant since 1960, when equipment belonging to the Excel school bus body plant was purchased. Peabody was first located in Excel's old facility at the Eaker Airpark hangar. Peabody manufactures heavy duty dump-truck and trash-truck bodies and hydraulic-lift tailgates. The Arkansas Street plant was opened in January, 1971. In addition to consulting present Peabody personnel, Eugene Tate, the original plant manager and manager at the time of construction of the new Arkansas Street plant, was contacted.

According to Tate, in 1969 Peabody was operating two Durant locations: one out of the Eaker Field hangar, the other in an old downtown location. The new Arkansas Street plant would allow consolidation of these two locations. Although construction of the new plant was not predicated upon the EDA water system project, the previous researchers noted that the EDA project application claimed that Peabody would expand its work force by 50 persons if it could consolidate and relocate within Durant's city limits, thus enabling it to obtain lower fire insurance rates (80, p. 2-30). Milkman's 1970 evaluation team thus attributed 50 expansion jobs to the EDA water project because it facilitated Peabody's relocation.

At the time of the original study, 227 people were employed by Peabody, of which 50 were attributed to the EDA project. Thus, 177 jobs existed before completion of the new plant and EDA water project. When the plant was revisited in December, 1976, 229 were employed; and the difference between 229 and 177, or 52 jobs, is project attributable.

Durant Electronics is the third Arkansas Street firm mentioned in the 1970 study. This subsidiary of the Strombecker Corporation operates water-cooled plastic injection molding machines to produce toys. The earlier study claimed that water consumption was enormous, "Approximately 200,000 gallons per month during peak production periods (80, p. 2-30). Since Durant Electronics opened in August of 1964 and was evidently able to obtain the water it needed, the researchers surmised that Arkansas Street had adequate water service prior to the EDA water project. Therefore, no Durant Electronics jobs were attributed to the water project.

Lloyd Miller, the original plant manager, was still manager at the time Durant Electronics was visited in 1976. He expressed surprise at the water consumption figure quoted in the earlier study, because cooling water is recirculated in the molding machines. A check of billing records for July, 1976, a recent peak production month, indicated a usage of only 54,800 gallons. It may thus be surmised that the previous researchers erroneously concluded that the Arkansas Street Water supply was adequate to accommodate a large industrial water user. There has, in fact, never been a large industrial water user located on Arkansas Street, and supplying one was not the reason the EDA project was needed.

Lloyd Miller explained the value of the EDA project in terms similar to those used by Bill Dufer (Hale-Halsell's manager) and Eugene

Tate (Peabody's former manager). Construction of Durant Electronics plant, in 1965, was undertaken with the understanding that water facilities necessary to allow their plant to be sprinklered would be forthcoming. Most of the firms along Arkansas lease their facilities from one of several public trusts, such as the Bryan County Industrial Authority. Clauses in their leases require that fire, public liability, and property damage insurance be in force at all times. The EDA project fulfilled water pressure needs.

The assurances given these firms are critical in deciding whether or not to attribute their jobs to the EDA project. Hale-Halsell was the first to locate on Arkansas. Although insurance agents wanted Hale-Halsell to construct its own auxiliary supply, pressures did not mount upon city fathers to remedy the situation until Durant Electronics, a firm not previously located in Durant or even Oklahoma, came on the scene. By the time Peabody, already a longtime Durant resident, began its new plant, the EDA project was well underway.

Summarizing the permanent jobs attributable to the three firms included in the original study, this researcher agrees with the previous researchers in regards to Hale-Halsell and Peabody-Galion. However, Durant Electronics located in Durant on the assurances of city fathers that the Arkansas Street water supply situation would be remedied. Had these assurances not been given, Durant Electronics would have located elsewhere. Additionally, the previous discussion cast reasonable doubt on the earlier researchers' conclusion that Arkansas Street's water mains were supplying heavy industrial water users before the advent of the EDA project. Therefore, the 89 persons employed by Durant

Electronics at the time of the revisit also seem to be project attributable.

The 1976-1977 visit to Arkansas Street revealed several new tenants, as can be seen in Table XXIV. Although about the only use of water by any of them is for restroom purposes, all benefit from the water project in the insurance sense.

Immediately west of Peabody-Galion is Diaper Jeans, owned by Redpath Industries, headquartered in Denison, Texas. Redpath bought this plant from Linda Dress Manufacturing in 1975. Since county tax records indicate the plant's first listing was also in 1975, Linda Dress apparently constructed and sold it the same year. Diaper Jeans manufactures pre-teen boys' and girls' garments, allegedly retailing in the upper price range for that type of clothing. Plant manager Bently Gordon, upon visitation to the plant, explained that the plant had been built entirely with private funds and was purchased later by Redpath, again with private funds. Moreover, it is against company policy to release any information not legally required. Follow-up contact with the headquarters office of Mike Redpath, President of Redpath Industries, produced the comment that only information contained in public records might be quoted in reference to Diaper Jeans. Therefore, according to the May, 1976, Community Data Sheet for Durant (Table XXVI), 85 Diaper Jeans jobs are attributable to the Arkansas Street water project.

Durant Dress Company opened its Arkansas Street location in October, 1976. Although the plant manufactures ladies' garments, the operations performed are similar to Diaper Jeans. Both Arkansas Street garment plants are sewing and finishing operations. Designing and

fabric cutting are performed at out-of-state locations. Once or twice a day panel trucks bring bundles of precut garment parts and return with finished garments to home office storage facilities.

Durant Dress' first location was opened in May, 1968. The original downtown location was closed when the October move to the new facilities was made. There are employed at the new location 84 persons, about the same number as were employed at the old location. However, this will not be the case for long because floorspace in the new facility is greater than in the old location, and new equipment is arriving. Plant manager Roger Leslie calculated that full scale, one shift, operation will employ a total of about 200 and that the job expansion now underway will be completed within a year. Thus, an expansion of 116 jobs should occur over the next year.

Olen Miller and Sons, Inc., is the employer located the farthest west along the original Arkansas Street industrial property. Olen Miller is the Coors beer distributor for southeastern Oklahoma. This firm is also an established Durant resident, having first located in Durant in 1954. The move from their smaller downtown location to the new Arkansas Street location was made in November, 1973. In addition to a greatly expanded warehouse facility, total employment has increased from 10 to 16. Thus, six expansion jobs are attributable to the relocation.

The other three Durant EDA projects were related to one another and to the construction of the Le Tourneau plant at Eaker Field industrial airpark. A total of \$715,000 of access road, water and sewer lines were constructed to facilitate this \$4.6 million plant, designed to manufacture electric motors and drive assemblies for Le Tourneau earth-moving equipment (74). Although this facility opened about on schedule

in 1972, it was not used as designed nor was it operated by Le Tourneau.

Le Tourneau merged with Marithon Manufacturing in September, 1971, and the plant was actually used to manufacture weapons casings instead of electric motors and drive assemblies. Employment reached a maximum of 152 in 1972 (of an anticipated 500); but when Vietnam hostilities slowed, defense contracts did also. The Durant plant became excess baggage and lay idle during 1973, while economic development groups tried various ploys to obtain a new tenant. The Marithon-Le Tourneau lease was formally assigned to the U.S. Electrical Motors (USEM) division of Emmerson Electric in March, 1974. Many of the plant's numerically programmed machine tools were adaptable to producing USEM's irrigation pump gear drives, and hiring was begun a month later (80, p. 37).

The Le Tourneau plant had not been completed when Milkman's 1970 study was conducted, and job impact from this project was essentially nil until USEM took over in 1974. Fortunately, the future looked much brighter when SODA's second direct loan project was visited in 1976: 213 new jobs were attributable to the plant.

The other two currently operating firms at Eaker Airpark (see Table XXV), as well as other public facilities, were served with access road, water, and sewer systems before the EDA-funded projects were constructed. However, water and sewer systems were inadequate to handle the new plant or other Airpark expansion.

Project funds built a pumping station and water tower and permitted city water to be extended to the Airpark. City sewer lines were similarly extended. A new, wider concrete access road was also constructed from U.S. 69 to the airfield. Since location of the other Airpark firms

TABLE XXV
 COMPLETED JOB-CREATING PRIVATE FIRMS
 LOCATED AT EAKER AIRPARK

Firm's Name	Year Opened	Type of Business
U.S. Elec Motors	1974	mfg irrigation pump gear drives
Stahl Metal Products	1964	mfg utility bodies and compartments for trucks
Viriden Lighting	1968	district warehouse for lighting fixture mfg.

Source: Establishment visits, 1976-1977.

Notes: (1) originally opened in 1971 as Le Tourneau; closed 1972, 1973. (2) Stahl and Viriden are divisions of the Scott-Fetzer Co., and share adjoining buildings.

was not predicated on EDA projects, their employment is not project attributable.

Even by the conservative standards of the original study, job impact is considerable and the future, bright. A net increase of 422 jobs is now attributable to the Durant EDA projects (Table XXVI). Moreover, uncounted expansion potential exists. Peabody-Galion is now operating only one shift but can employ about 500 on a three-shift basis. The USEM plant can also expand to about 400 jobs on a three-shift basis. Finally, both garment plants are presently operating only one shift.

Table XXVII summarizes several aspects of jobs attributed to job-creating EDA projects in the SODA area. Its format corresponds to one in Milkman's (83, p. 31) 1970 study from which comparison figures are given where possible. Conservatively, 2,865 jobs are attributable to the EDA growth center projects, whereas only 461 were previously counted (including corrections for Brockway Glass in Ada and Durant Electronics). Because the EDA stressed job impact resulting from EDC projects, both the previous and present analysis does too. The primary measure of comparison previously used was "EDA investment (in dollars) per job created (or saved)" (83, p. iii). This measure is also presented in Table XXVII (page 137). The reader should note, however, that only the following EDA projects were included in the previous study: Ada's access road, industrial park, and Solo; the Durant water system. Two noncenter job-creating projects were also included and will be discussed in the following subsection.

EDA Noncenter Projects

Four completed projects listed in Table XVI have not been mentioned.

TABLE XXVI
 DURANT JOBS ATTRIBUTED TO EDA PROJECTS
 IN 1970 AND 1977

Firm's Name	1970 Study	1977 Study
Peabody	50***	52**
Durant Electronics	89*	89*
Diaper Jeans	Not constructed	85
Durant Dress	Not constructed	116**
Olen Miller	Not constructed	6**
USEM	Not constructed	213
Totals	139	561

Source: (1970) U.S. Department of Commerce, Economic Development Administration. Detailed Case Studies: Supporting Documentation for the EDA Growth Center Evaluation. U.S.D.C., February, 1972.

(1977) Compiled from sketches in text.

Notes: *Durant Electronics was not counted in previous study but should have been. See text for explanation.

**Firms were located in Durant before EDA project, and built new facilities on EDA project sites. Only expansion jobs have been counted.

***As stated in 1970 study.

Two of them are social overhead capital (SOC) projects (primarily oriented toward providing satisfactions of a less materialistic nature that enhance the quality of life available to residents of a community). The other two are economic overhead capital (EOC) projects (primarily oriented toward the support of directly productive activities).³

One of the two SOC projects is the first approved and completed project in the SODA district: the Arbuckle Lake pollution control project (74; Table XVI). The Lake of the Arbuckles was constructed under the auspices of the Arbuckle Recreation District, a forerunner of SODA. Sulphur sewer facilities drained into the lake's watershed and threatened to pollute the new lake with raw sewerage until completion of this project. Basically, the project pumps affluent from the disposal plant into another watershed. The largest beneficiaries have been the approximately 2,000,000 annual visitors to Platt National Park and Arbuckle Lake. Developers of vacation homes have numerous sites around the northwestern quarter of the lake's perimeter and appear to be doing a brisk business hawking lots.

The Ardmore Aquaduct will soon, however, reorient the SOC nature of Arbuckle Lake. Several years ago Ardmore won a civil lawsuit against Lawton, Oklahoma, for water rights to the lake. As a result, those communities participating in the lake's construction share water rights to it: Davis, Wynnewood, Kerr McGee, Rural Water District Three, Sulphur, Dougherty, Ardmore, and the Goddard Youth Camp (47). About \$840,000 of EDA funds are involved in bringing this aquaduct from the lake to Ardmore Airpark. Moreover, the city of Ardmore has already voted bonds to continue construction the 18 more miles into Ardmore and

also to build a new water treatment plant. Project completion is scheduled for 1979.

The other SOC project is a sewage collection system and treatment plant built for Tishomingo (74; Table XVI). The collection system provides sewer service to a 39 block area of disadvantaged persons. The treatment plant replaces and enlarges treatment facilities to accommodate the new collection system. This project was constructed to provide basic sewer services for the community, although a nursing home and the County Hospital are listed as specific beneficiaries.

The remaining two projects have an EOC orientation, although they too fill basic community needs. Both projects have similar origins and are similar in nature. The earlier project is the water plant, tower, and service lines for the city of Davis. The later project is a similar water plant and tower for the city of Atoka. A companion industrial park sewer project rounds out the Atoka package (Table XVI).

The Davis project is the second SODA project begun and completed with EDA assistance. It was designed to permit Davis to draw water from the Lake of the Arbuckles and obtain enough water pressure to meet requirements of the new Sequoyah Mills Carpet plant. Seven miles of supply line were needed to link the treatment plant west of town, the town, and the carpet mill south of town. Although the water plant serves the whole town (whose 1970 population was 2,223), it was needed primarily for the carpet mill. The mill had become an important employer by the time the water project was inventoried in 1973 and was credited with 250 jobs (74). Within a year, however, Sequoyah was bankrupt. A visit in January, 1977, confirmed that the facility's status remains the same. Approximately 200,000 square feet of vacant building awaits a new tenant.

However, Bill Clifford, SODA Industrial Development Specialist, explained that legal entanglements had prevented securing a new tenant for the plant, but that efforts would soon be underway.

Evidence of new activity in Davis has already surfaced. The January 17, 1977, edition of The Daily Ardmoreite carried a press release from Third District Congressman Wes Watkins announcing road and street improvements to the Davis industrial park containing the plant amounting to \$150,000 (\$9,240 from the Ozarks Regional Commission, \$205,000 from the U.S. Department of Transportation, and \$35,760 from the city of Davis). Hopefully, Davis will be as fortunate as Atoka. However, competition will be keen within SODA, because presently there are several vacant suitable sites: Vindale and Forester's facilities in Ada, as well as Ardmore Airpark structures, to be specific.

A water treatment plant which physically looks identical to the Davis treatment plant, was completed in Atoka in 1973. However, it was not included in the project inventory (74). Atoka is a small community located in the heart of the RA (see Figure 4, supra, p. 36).

According to Noel Mann (36), Assistant Director of SODA, the Atoka project was originally to be an industrial site for Sequoyah Carpet Mills, and 300 or so jobs were to be created. Because the anticipated influx of workers would strain Atoka's water and sewer system, funds were included for a water line and a sewer line from the new treatment plant north of town (adjacent to the industrial park) into Atoka. However, before the project was completed, Sequoyah went bankrupt. SODA then convinced the EDA to develop the industrial site for speculative purposes, but EDA required that the city of Atoka construct the water line and sewer line into town.

The "speculation" paid off, even before the treatment plant had been completed. Ethan Allen (EA), a highly regarded manufacturer of furniture from the northeastern part of the nation, with a penchant for locating in small towns, had decided it needed a plant in the Southwest. Plant Manager, Keith Sanders, thought that the availability of a prepared site was the most important reason for EA's decision to locate in Atoka. Financing was arranged through the Atoka County Industrial Authority, and the \$2,000,000 facility constructed to EA's specifications and leased to them for 25 years. Operations were begun in August, 1973, and 119 workers were busily manufacturing quality American traditional upholstered furniture by the time the plant was visited in February, 1977. Atoka paid for the water line and sewer line into town; and since a tenant for the site had been found, SODA then convinced EDA to use funds originally earmarked for the water line to Atoka to build a water line from the Atoka treatment plant toward Stringtown, a small community seven miles north of Atoka. It was intended that Atoka sell water to Stringtown and thus supplement Stringtown's meager water supply.

Summary statistics for job-creating projects (both growth center and noncenter) are given in Table XXVII. Where available, comparable statistics from the previous EDA study are also given (80)(83).

Sample surveys of firms whose jobs are attributable to EDA projects were also conducted. The surveys are the basis of the statistics presented in Table XXVII, as well as the rest of the chapter. Survey methodology and analysis is considered in the next section.

TABLE XXVII
 JOB IMPACT OF EDA CATALYZED
 JOB-CREATING PROJECTS

Evaluation Category	Ada Access Road	Ada Industrial Park	Ada Solo Cup	Ardmore Airpark Access	Ardmore Uniroyal	Durant Water System	Durant Eaker Field & LeTourneau	Atoka Water System	Davis Water System	Total (Center Projects Only)	Total (includes non-center Projects)
EDA Participation (Dollars)											
1977 Study	\$113,000	\$184,000	\$1,233,000	\$487,000	\$866,000	\$ 417,000	\$2,613,000	\$693,200	\$233,000	\$5,913,000	\$6,839,200
1970 Study	113,000	184,000	500,000	NC	NC	417,000	NC	NC	NS	1,214,000	NS
Attributed Jobs (Number)											
1977 Study	192	200	306	0	1,606	348	213	119	0	2,865	2,984
1970 Study	97	60	165	NC	NC	139	NC	NC	NS	461	NS
Jobs Attributed to RA Residents (Percent)											
1977 Study	** NA	14%	3%	** 10%	NA	12%	4%	97%	0%	8%	17%
1970 Study	** NA	15%	2%	NC	NC	0%	NC	NC	NS	3%	NS
Jobs Attributed to Unemployed & Underemployed (Percent)											
1977 Study(total)	NA	31%	NA	NA	NA	41%	36%	22%	CI	37%	36%
1970 Study(total)	0%	5%	NA	NC	NA	0%	NC	NC	NS	13%	NS
1977 Study(RA)	NA	0%	NA	NA	NA	5%	0%	22%	CI	2%	5%
1970 Study(RA)	0%	5%	NA	NC	NA	0%	NC	NC	NS	1%	NS
1977 Study(U.C.)	NA	21%	NA	NA	NA	36%	36%	0%	CI	32%	28%
1970 Study(U.C.)	0%	25%	NA	NC	NA	28%	NC	NC	NS	11%	NS
EDA Investment Per Job (Dollars)											
1977 Study	\$ 588	\$ 920	\$ 4,029	CI	\$ 539	\$ 1,198	\$ 12,268	\$ 5,825	CI	\$ 2,064	\$ 2,292
1970 Study	1,165	3,067	3,030*	NC	NC	3,000	NC	NC	NS	2,633	NS
EDA Investment Per RA Job (Dollars)											
1977 Study	NA	\$ 6,229	\$ 134,314	CI	NA	\$ 9,986	\$ 306,690	\$ 6,005	CI	\$ 25,700	\$ 13,433
1970 Study	NA	20,444	125,000*	NC	NC	CI	NC	NC	NS	87,780	NS
Annual Salary Generated (Dollars)											
1977 Study	NA	\$658,200	\$1,800,000	NA	NA	\$5,227,649 [@]	\$1,930,000	\$856,000	\$ 0	\$7,595,849	\$8,451,849
1970 Study	NA	295,000	699,000*	NC	NC	512,000*	NC	NC	NS	1,306,000	NS

Source: (EDA Participation) Table XVI
 (Collier) Field visits, Employee & Funded Project Questionnaires
 (Milkman) U.S.D.C., Economic Development Administration.
 Program Evaluation: The Economic Development Administration
 Growth Center Strategy. USDC, February, 1972, Table 4, p. 31.

Notes: NC means project incomplete at time of previous study.
 NA means information not available.
 NS means not assessed because previous study considered growth center projects in SOJA area only.
 CI computation irrelevant, divisor zero.
 * based on \$500 pre-expansion participation.
 ** percent of 1976 total Airpark employment, not EDA attributable.
 @ includes Peabody & estimates for Durant Dress.
 + not including Durant Electronics.
 ** based on employer's estimate.

Direct Effects of Evaluated Firms

Four related topics are discussed in this section. The design of a survey of SODA firms and their employees will be discussed first. Second, problems of measuring opportunity and the measures used in the analysis of the survey data will be considered. Next, five dimensions of evaluated firms' employees will be inferred from survey responses: wage effects, earning effects, employee residency, migration effects, and commuting effects. Finally, the extent to which formerly "disadvantaged" persons hold evaluated firm jobs will be considered.

Not all firms permitted interviews, as can be determined from the preceding project sketches. Thus, in the remainder of this work, unless stated otherwise, "firm" will refer to an evaluated firm that completed either the Funded Project Evaluation (Appendix B) or Employee Questionnaire (Appendix A). Consider next survey design and conduct.

Survey Design

Two survey instruments were constructed with which to collect information. The Funded Project Evaluation (Appendix B) was to be administered to collect background information on the firm being evaluated and to determine the sample of employees to be interviewed. The Employee Questionnaire (Appendix A) was to be administered to a stratified random sample of employees to collect wage and earning information, to collect demographic data, and to determine geographically where total family income was spent. Although the design of the two instruments bears little resemblance to those used in the previous growth center study, comparable information was collected (83, Appendix F). Since information

reflecting firms' operating statistics and individuals' incomes and spending habits was considered confidential by many respondents; their identity is withheld in the analysis.

Ten SODA firms participated in the Funded Project Evaluation (Appendix B), but only nine allowed employee interviews. Since four of the firms are located in Ada, five in Durant, and one in Atoka, inferences are at best valid for two of three growth centers plus the Atoka employer. Incidentally, Ada and Durant were the only two growth centers for which employee information was obtained in the earlier study (83).

A ten percent stratified random sample of participating firms' employees was selected using question eight of the Funded Project Evaluation (Appendix B) to stratify employees into seven job categories and by sex.⁴ The categories, and the occupations within each, were condensed from categories on U.S. Department of Commerce (USDC-EDA) form ED-612 (81) and were adopted as strata because they are familiar to personnel managers (Appendix B, p. 233). Since no part-time employment was found among the firms interviewed, 14 categories of full-time employment were possible, although not every category was applicable to every firm.⁵ All calculations of means and variances were weighted to compensate for discontinuous data. Sources of error and computation procedures are discussed in Appendix C.

A high degree of interview consistency was maintained between firms and between employees because all Funded Project interviews were conducted by the author and employee interviews were conducted by the author and one assistant. Moreover, nonresponse bias is minimal because only one or two employees in even the largest firm reneged. Replacements of the same sex were simply selected at random from those

remaining in the strata. It is, of course, disappointing that some firms declined participation.

Measuring Opportunity

Emphasis is placed by the PWEDA on the creation of permanent job opportunities. The intended targets for these opportunities are unemployed and underemployed residents of GCs and GC and RA counties (83, D-7). Therefore, it is appropriate to determine if employees holding EDA-catalyzed jobs are receiving some combination of increased real wage rates, real earnings, and/or real total family incomes relative to their preceding endeavor. However, restricting the measurement of opportunity to a wage rate, earnings, and or total family income sense does not solve measurement problems, such as those caused by inflation, time-related, legislative, or other factors. Moreover, the problem of defining underemployment is a subjective process that may as well be considered first.

Identification of underemployment is frequently directly or indirectly related to some concept of poverty level income, with allowances for demographic characteristics of the individuals being classified. Pioneering work on counting the poor has been done by Mollie Orshansky (50). Studies by Kuehn (32) and Kampe (30) utilize forms of this technique, as does the previous EDA study (83). However, different scales of poverty level income are used by different researchers.

In the previous EDA study, underemployed workers were defined as:

persons who were previously part-time employees seeking full-time jobs and workers who were members of poor households. Former housewives working to supplement family incomes previously more than \$1,000 above the poverty level are not counted as previously unemployed or underemployed (83, A-6).

Office of Economic Opportunity (OEO) Income Poverty Guidelines for December 1, 1970, were used to determine whether a household was "poor" prior to taking their growth center job. Table A.2 (83, p. A.7) is reproduced as Table XXVIII, and appears to be the only scale used. So that the underemployed can be identified in a manner comparable with the earlier study, the previous definition of underemployed will be used along with OEO Poverty Guidelines in effect for the year ending the respondent's previous status and for the interview year.

Total family income for an employee may be determined from the Employee Questionnaire (Appendix A). Family income at interview time is obtained by summing before-deduction earnings (question 7f), income from a second job (question 8c), income earned by other household members (question 9b), public assistance income (question 10b), and other income (question 20b). Family income for the immediately preceding status may be obtained by summing similar components (questions 15g, 17c, 18b, 19b, and 20b). The size of the respondent's household is also available (question 26). By contrasting these sums with relevant OEO Poverty Guidelines, underemployed respondents can be identified. Now that underemployment has been defined, detailed consideration of some effects of jobs on respondents may begin.

Effects on Employees of Evaluated Firms

Wage Effects. For wage rate analysis, consider the 34 respondents who were previously (and at interview time were still) paid on an hourly basis. A positive wage rate differential could be evidence that catalyzed jobs are having favorable wage rate effects for hourly paid employees. However, several confounding factors must be considered.

TABLE XXVIII
SCALE FOR IDENTIFYING POOR HOUSEHOLDS

Number in Household	Nonfarm Income Under	Farm Income Under
1	\$1,900	\$1,600
2	2,500	2,000
3	3,100	2,500
4	3,800	3,200
5	4,400	3,700
6	5,000	4,200
7	5,600	4,700
More	Add \$600 per person	Add \$500 for each additional person

Source: U.S.D.C., Economic Development Administration. Program Evaluation: The Economic Development Administration Growth Center Strategy. USDC, February, 1972, Table A.2, p. A-7.

Many factors besides the job itself might account for differences in hourly wage rates. They may, for example, be attributable to differences between industries, between the worker's sex, to changes in worker ability (due to vocational experience or training), or to time-related factors (such as inflation, changes in minimum wage laws, and a host of antidiscrimination laws and their court interpretations). Least squares regression is a technique that can be used to control for some of the more important factors.

The real hourly wage rate differential is the difference to be explained (RWRD). It may be obtained by deflating nominal wage rates with the appropriate Consumer Price Index (CPI). Thus, the RWRD, corrected by dividing the nominal wage rate difference ($W_t - W_o$) by the CPI for corresponding months (P_t, P_o , secured from the Economic Report of the President, 1967 = 100), may be written as:

$$\text{RWRD} = \frac{W_t}{P_t} - \frac{W_o}{P_o} .$$

The subscript, t, denotes the interview month; and the subscript, o, denotes the end of the respondent's immediately preceding endeavor. RWRD may be positive or negative.

A Standard Industrial Classification Code (SIC) may be assigned to describe the major product produced by a firm (43). The SIC codifies the entire field of economic activities into ten two-digit major groups, and provides further breakdowns into three-digit industry groups and four-digit industries.⁶ The four-digit SIC most representative of the products produced by the ten SODA firms visited are:

<u>Industry SIC</u>	<u>Industry Title</u>
2335	Manufacturing; women's, misses' and juniors' dresses
2512	Manufacturing; upholstered wood household furniture
2531	Manufacturing; public building furniture
3069	Manufacturing; fabricated rubber products
3079	Manufacturing; miscellaneous plastic products
3536	Manufacturing; hoists, cranes, and monorails
3561	Manufacturing; pumps and compressors
4213	Common carrier trucking
5095	Wholesale distribution of beer and ale

Differences between industries may be represented by using the two-digit major group SIC to define the dummy variable, I. One dummy variable class can then be used to represent Ethan Allen and Scott Manufacturing (both belong to major group 25); another class can represent General Tire, Durant Electronics, and Solo Cup (since all three belong to major group 30); a third class can represent Peabody and U.S. Motors (because they both belong to major group 35); and the other firms can be represented by their own dummy variable classes.

Another dummy variable, S, can be used to represent the respondent's sex. Males may be represented by one class and females by the omitted class. Thus, the difference between male and female wage rates can be assessed, although no a priori decision about the sign of the sex coefficient can be made.

The previous and present occupation of each respondent has been codified into six-digit Dictionary of Occupational Title (DOT) codes (85). The first three digits are known as the Occupation Group Arrangement (OGA) and "provide a method of grouping jobs having the same basic

occupational or worker trait characteristics so that the user can discern various relationships among occupations" (85, p. xvi). The last three digits are known as the Worker Trait Arrangement (WTA) and provide "a standard approach to classifying the abilities, vocational experiences, and/or potentials of workers" (85, p. xvi). The first digit of the OGA delineates occupational categories roughly ranking occupations in descending order of status. The categories are identified as follows:

<u>First Digit</u>	<u>Occupational Category</u>
0 } 1 }	Professional, technical, managerial
2	Clerical and sales occupations
3	Service occupations
4	Farming, fishery, forestry and related industries
5	Processing
6	Machine trades
7	Bench work
8	Structural work
9	Miscellaneous

A proxy for changes in job status may be constructed by finding the difference between the OGA first digit for the present and previous job (OGA). The differences can range from positive 9 (indicating a worker who was formerly a professional but is presently performing miscellaneous occupational tasks) to negative 9 (for the opposite case).

The number of months elapsing between the previous endeavor and present job can be calculated. This variable (E) will serve as a proxy for time-related factors such as tenure and experience gained on the job. As in the case of the sex dummy variable, an a priori decision about the sign of the coefficient cannot be made because the correction of RWRD for inflation may offset effects of time.

Since firms participating in the survey were all covered by federal minimum wage laws, the real minimum wage rate difference (RMWRD) may be an important determinant of the real wage rate difference (RWRD). RMWRD can be constructed for each respondent by correcting the minimum wage rate applicable to the present (MW_t) and previous (MW_o) endeavors for inflation by dividing by the CPI for the corresponding periods (P_t and P_o). The RMWRD thus constructed is:

$$\text{RMWRD} = \frac{MW_t}{P_t} - \frac{MW_o}{P_o} .$$

A positive RMWRD coefficient is expected if RMWRD is contributing significantly to RWRD; otherwise, the coefficient will be insignificant.

A linear additive model of the RWRD incorporating all hypothesised factors may now be written:

$$\text{RWRD} = \alpha + \beta_1 I_i + \gamma S + \delta \text{OGA} + \epsilon E + \zeta \text{RMWRD} + \mu$$

In this formulation, the explanatory variables have the following definitions:

α = the constant term,

I_i = dummy variables representing major SIC groups within which SODA firms fall. The omitted class is SIC 23, I_1 represents SIC 25, I_2 represents SIC 30, I_3 represents SIC 35, and I_4 represents SIC 50,

S = dummy variable representing respondent's sex. Female is the class omitted,

OGA = the difference between the first digit of the OGA codes for the present and previous endeavor,

E = the number of months elapsing between the end of the respondent's previous job and the interview date,

RMWRD = the real minimum wage rate difference,

μ = the error term.

The coefficients can be interpreted as:

- α is the intercept. It represents the dollar per hour change in real wage rate per unit change in other factors not explicitly included as variables; for example, the dummy variable classes omitted to prevent obtaining a singular correlation matrix;
- β_i is the industry intercept shift. Each β represents the difference between its SIC class and the intercept; the influence of the particular SIC class under consideration may be obtained by finding $\beta_i + \alpha$;
- γ is the sex intercept shift. γ represents the difference between males and the intercept; the influence of males alone may be obtained by finding $\gamma + \alpha$;
- δ is the dollar per hour change in real wage rate per unit difference between the first digit of the OGA codes for the present and previous endeavor;
- ϵ is the dollar per hour change in real wage rate per month of time elapsing between the end of the respondent's previous job and the interview date;
- ζ is the dollar per hour change in real wage rate per dollar (per hour) change in real minimum wage rate.

Several relevant null hypotheses may be tested by this specification:

- 1) a failure to reject $\beta_i = 0$ for any particular SIC class implies that the firms represented by the class are having no significant effect on RWRD beyond those represented by the intercept term;
- 2) a failure to reject $\gamma = 0$ implies that males receive no significantly different real hourly wage than is represented by the intercept term (which includes female wage rate effects);
- 3) a failure to reject $\delta = 0$ implies that the OGA difference does not explain RWRD;
- 4) a failure to reject $\epsilon = 0$ implies that the length of time a respondent holds his job has no significant effect on RWRD;
- 5) a failure to reject $\zeta = 0$ implies that RMWRD has no significant effect on RWRD.

The regression estimate incorporating all of the variables yields the following estimates of coefficients:

$$\widehat{\text{RWRD}} = -0.253 + 0.340I_1 + 0.620I_2 + 1.17I_3 + 0.221I_4$$

(1.128) (2.055)* (3.511)*** (0.636)

$$-0.479S + 0.025OGA + 0.003E - 0.719\text{RMWRD}$$

(2.077)* (0.738) (1.681) (.0908)

$$\text{SEE} = 0.377, \text{ F Ratio} = 4.065***, R^2 = 0.565, \phi = 0.064$$

$$\text{D.W.} = 1.81, n = 34.$$

Given in parenthesis below coefficient estimates are t-ratios, where asterisks denote that a coefficient is significantly different from zero at the (ϕ) 20 percent level, (*) 10 percent level, (**) the 5 percent level, or (***) 1 percent level. Since the F ratio is significantly different from zero at a level below 1 percent, the hypothesis that all coefficients equal zero is rejected. However, the t-ratios indicate that only the coefficients I_2 (SIC 30), I_3 (SIC 35), S, and E are significantly different from zero. Before analysis of the results, it is necessary to question the quality of the estimate.

Perfect multicollinearity occurs when any single explanatory variable is perfectly correlated with any other explanatory variable or with any linear combination of the other explanatory variables (31, p. 380). When perfect multicollinearity is present, the solution of the least squares normal equations is indeterminate. However, some degree of multicollinearity is usually present, albeit less than perfect. As perfect multicollinearity is approached, the variances and covariances of the variables involved approach infinity, as do the corresponding standard deviations. Since the t-ratios are the ratio of the coefficient estimate to its standard deviation, multicollinearity will cause the t-ratios to be smaller than they might otherwise be. Variables that might be significantly different from zero (in the absence of multicollinearity) can thus appear insignificant.

One indicator of the degree of multicollinearity present is provided by calculating the determinant of the correlation matrix of the explanatory variables (31, p. 389). Determinants near zero indicate that some or all of the explanatory variables are highly correlated. The Phi (ϕ) value given with the above regression estimate is the value of the determinant of the correlation matrix for this estimate. It is relatively small compared to the determinant value to be discussed later. Thus, suspicion is aroused that a high degree of multicollinearity is present.

A way of locating the source of the multicollinearity is to calculate the multiple correlation coefficient (R^2) of one explanatory variable with the other explanatory variables (31, p. 390). The closer this so-called covariance ratio is to one, the higher the degree of multicollinearity that supposedly exists between the explanatory variable and one or more of the other explanatory variables. The covariance ratios for the above estimate are:

<u>explanatory variable</u>	<u>covariance ratio</u>
I_1 (SIC 25)	0.556
I_2 (SIC 30)	0.764
I_3 (SIC 35)	0.846
I_4 (SIC 50)	0.374
S	0.656
OGA	0.386
E	0.249
RMWRD	0.361

By this guideline, I_2 , I_3 , and S appear particularly suspect.

The total correlation matrix is also useful for tracking down the source of multicollinearity, because the simple correlation between any

two variables may be observed. The highest correlation for I_2 is with I_3 ($r = -0.502$, where $-1 < r < 1$). But I_2 and I_3 are members of the same dummy variable set. Examination of the raw data revealed that most of the firms (of the 34 in this sample) belong to either SIC 30 or SIC 35. Thus, this negative correlation signifies this fact and is no cause for alarm. However, the highest correlation for I_3 is with S ($r = 0.618$), signifying that mostly males work at the firms in SIC 35. Thus, the coefficients of I_3 and S are probably capturing the same effects. Since I_3 is one of a set of mutually exclusive dummy variables, and no logical basis exists for omitting one SIC class in preference to another, it will be chosen to omit S for further tests.

While examining the total correlation matrix, it was observed that the next highest simple correlations among explanatory variables (other than among the I classes) occurs between $RMWRD$ and S ($r = 0.319$) and between $RMWRD$ and E ($r = -0.325$). Although the covariance ratio for $RMWRD$ is not particularly high, $RMWRD$ is not significantly different from zero. Thus, some of the explanatory power of $RMWRD$ is already expressed by E . This relationship is logical, because elapsed time (E) is implicitly a part of the computation of $RMWRD$.

Another regression estimate omitting both S and $RMWRD$ was run. It yielded the following estimates of coefficients:

$$\begin{aligned} \widehat{RWRD} = & -0.165 - 0.007I_1 + 0.179I_2 + 0.563I_3 - 0.032I_4 \\ & (0.862) \quad (0.027) \quad (0.746) \quad (2.699)** \quad (0.094) \\ & + 0.063OGA + 0.004E \\ & (2.056)* \quad (1.823)* \end{aligned}$$

$$SEE = 0.398, F \text{ Ratio} = 4.087***, R^2 = 0.476, \phi = 0.291$$

$$D.W. = 1.77, n = 34.$$

Again, the F ratio is significantly different from zero at a level below 1 percent. The determinant of the correlation matrix (ϕ) is 4.6 times larger than for the previous estimate, indicating a reduction in multicollinearity. The covariance ratios for the second estimate are:

<u>explanatory variable</u>	<u>covariance ratio</u>
I ₁ (SIC 25)	0.385
I ₂ (SIC 30)	0.583
I ₃ (SIC 35)	0.557
I ₄ (SIC 50)	0.280
OGA	0.146
E	0.185

All covariance ratios are less than those for the corresponding variable in the previous estimate, thus supporting the evidence that multicollinearity has been reduced. One further F test is particularly illuminating.

Begin by considering the first estimate as an "unrestricted" estimate. The second estimate is thus restricted, relative to the first, because leaving S and RMWRD out of the estimate implies they have no significant power in explaining the variance of RWRD that is not captured by the remaining variables. Thus, we wish to test the joint hypothesis that $\gamma = \zeta = 0$. This hypothesis may be tested by computing (31, p. 370):

$$\frac{\frac{R_L^2 - R_T^2}{L - T}}{\frac{1 - R_L^2}{n - L}} = \frac{\frac{0.565 - 0.476}{9 - 7}}{\frac{1 - .565}{34 - 9}} = 2.586,$$

where R_L^2 = the coefficient of determination of the unrestricted estimate,

R_T^2 = the coefficient of determination of the restricted estimate,

L = the number of parameters estimated in the unrestricted estimate (including the intercept),

T = the number of parameters estimated in the restricted estimate (including the intercept),

n = the number of observations in the sample. If the null hypothesis ($\gamma = \zeta = 0$) is true, then the above ratio is an F statistic with L - T numerator degrees of freedom and n - L denominator degrees of freedom. The tabled value of F at the 5 percent significance level, with 2, and 25 degrees of freedom, is 3.39. Thus, the hypothesis that $\gamma = \zeta = 0$ cannot be rejected at the 5 percent level, and it is concluded that the simpler estimate, allowing for differences in degrees of freedom, performs about as well as the first estimate, but with considerably less evidence of multicollinearity. Moreover, the Durbin-Watson test (D.W.) for autoregressive disturbances indicates no significant autoregression at the 5 percent significance level for either estimate (31, p. 294).

Since the second estimate is the preferred one, interpretive comments will refer to it. Because the dummy variable class representing SIC 23 was omitted, the coefficients as estimated represent the differential effects of the SIC of interest from the effects of the omitted class. Even though the intercept is not significantly different from zero, its effects need to be allowed for. Thus, the values of the coefficients of the dummy variables, after adding back the intercept value, are:

<u>variable</u>	<u>coefficient</u>
I ₁	-.172
I ₂	.014
I ₃	.398
I ₄	-.197

These coefficients indicate that if the effect of the SIC classification of the firms is considered by itself, only the firms in SIC 35 contribute greatly to the average 25 cents per hour RWRD. Since both firms in this SIC class employ skilled machinists, whereas the bulk of the jobs at the other firms require relatively little skill, this observation is not particularly surprising. Moreover, the coefficient of OGA indicates that the hourly paid employees are changing jobs in such a fashion that differential job characteristics are worth a little over six cents per hour more. Finally, four-tenths of a cent per hour more is earned for every month elapsing (E) between the present and former endeavor.

It should be noted that RWRD averages about 25 cents per hour. Moreover, the standard deviation of RWRD is about 50 cents per hour and RWRD ranges from a negative 63 cents per hour to a positive \$1.43 per hour. Thus, RWRD is rather volatile to begin with. Since the coefficient of I_3 is positive and highly significant, the positive average RWRD is largely attributable to jobs provided by the two Durant firms in SIC 35. One of these firms would not exist without its extensive EDA involvement. The other would not have built its present new and expanded facility without the EDA-sponsored water project on which it is located. Although it is not possible to attribute all of the positive RWRD to EDA, hourly employees at the two firms in SIC 35 should appreciate EDA efforts.

Earnings Effects. Earnings differentials need consideration in addition to wage rate differentials because earnings are the product of wage rates and hours worked. Question 15h asks the respondent what he

thinks he would be earning (as of the interview date) if he were still in his former employment. By comparing earnings reported in question 7f with the response to question 15h, an earnings comparison can be obtained that avoids several empirical problems.

There is no need, for example, to correct these earning figures for inflation, because they reference the same instant in time. Likewise, temporal differences in minimum wage rates and other experience factors are inapplicable. Thus, only qualifications for including a case need to be considered. Weighted means and variances can then be computed and a straightforward statistical test for significance of difference run. However, one area of criticism might be anticipated at the outset. How accurately is the respondent likely to know what he would presently be earning if he were still in his former job?

Some idea of response accuracy can be obtained by mentioning several types of answers given by respondents when asked question 15h. Many respondents simply replied that the former job paid the prevailing minimum wage and that conversations with friends still employed there indicated that such continued to be the practice. Respondents of this type were next queried about the average hours worked. If they replied that only a 40-hour week was worked, then the current minimum wage rate was multiplied by 160 to obtain an average monthly figure. The computed amount was then mentioned to the respondent for verification. If overtime was typical, then an additional amount was added, at the rate of one and one-half the regular-time wage rate multiplied by the respondent's claimed typical monthly overtime hours.

One former city employee responded that he simply did not know. Since this individual's previous job was known, a call to the city

manager of the city where the respondent was formerly employed quickly produced the exact monthly pay the individual would be drawing, including seniority increments.

One former self-employed mechanic also responded that he had not kept track of typical mechanic's earnings. A discussion ensued about the level of his qualifications (i.e., was he capable of transmission work, air conditioning repair, engine overhaul and so forth). After determining that he felt capable only of general tune-up and replacement of such items as water pumps and fuel pumps, but not air conditioning or transmission overhaul, three garages in the same vicinity, specializing in the respondent's line of work, were visited. Each of the three self-employed mechanics was asked what his average before deduction monthly earnings would be. The average of the three was then used to approximate this respondent's unknown earnings.

Answers to question 15h also lend themselves to a certain degree of checking. Suppose a respondent described his former job with an occupation that was included elsewhere in the sample. The answer given by the respondent can then be crosschecked with the present job earnings of another respondent with a similar occupation.

However, the cases cited are exceptions, rather than the rule. Most of the respondents simply answered that they had been earning the prevailing minimum wage and, through communications with friends still with the former employer, knew that the present minimum wage was currently being paid. Both interviewers, after over one hundred interviews, thought that the respondents kept close watch over their immediately preceding job. Along these lines, note that question 16 asked, in open-ended fashion, why the respondent took the present job. Categories of

answers to this question were retrospectively defined by grouping like responses. The most frequent answer was that the present job offered better opportunity for advancement and/or better pay than the previous job. It is possible that respondents, by keeping track of their previous job, are seeking to justify to themselves their decision to switch jobs. Thus, the answers appear to be fairly accurate.

A subjective decision must also be made of what type of previous endeavor qualifies a case for inclusion in the earnings comparison. If the respondent answered question 12 either "not working" or "unemployed," no job earnings will be recorded in question 15h. Thus, two comparisons are more appropriate than one. First, the population estimate of the present average monthly earnings for those previously "unemployed" respondents should be calculated. Since the average previous earnings of this group were zero, the EDA-catalyzed job opportunity is significant and the average earnings from the present job can be taken as the measure of the job's value to these respondents. In the process of screening the data for previously "unemployed" respondents, the "not working" respondents will be screened for those answering question 13 as "discouraged," and these respondents will be included in the "unemployed" group. Second, the population estimate of the average present monthly earnings and average monthly earnings respondents think they would be earning if still in their previous jobs will be estimated, using weighted techniques. A test of the null hypothesis,

H_0 : the average monthly earnings differential attributable to job opportunities is zero,

against the one-tailed alternative,

H_A : the average monthly earnings differential attributable to job opportunities is positive,

will then be made. The statistical procedure is discussed in Appendix C, and results of the test are discussed in the following paragraphs.

The sample estimate of the population of 961 employees reveals that before taking their present job, 21.4 percent were unemployed, 21.7 percent were not working (mostly because they were housewives or students), and 56.9 percent were previously employed. The mean earnings, at interview time, of the entire population is estimated to be \$657.09 per month. When broken down, the mean earnings, at interview time, of the previously unemployed are estimated to be \$581.91; of the previously not working, \$599.85; and of the previously employed, \$707.20 per month. Although the reader may decide differently, this writer thinks that at most the previously unemployed and previously employed should be considered benefiting from a catalyzed job in the earnings sense, because the estimated 208 employees that were previously not working were not even looking for work. Incidentally, an estimated 1.2 percent of the population responded that they were not working because they were too discouraged to search further for jobs. This 1.2 percent was reclassified as unemployed, and thus the unemployed earnings statistics include them.

Claiming that the 206 previously unemployed individuals benefit from the EDA-catalyzed job, an average of \$581.91 per month is debatable. One may, for example, claim that they would surely have found jobs somewhere, paying at least the going minimum wage. One may also counterclaim that they had not found jobs elsewhere and that the unemployed thus benefit by the entire amount. Since these claims and counterclaims are conjectural, this summary may be made more informative by considering the difference between present job earnings and what the employee thinks he would be earning if he still held his former job.

Thus, the estimated 547 employees that were previously employed and that now earn an average \$707.20 per month claimed that they think they would be earning an average of \$555.11 per month if they still held their former jobs. Since the two figures derive from the same respondent, in each case, a paired statistical test was run. The calculated test ratio (see Appendix C) is at least five. Using a normal probability table, this ratio indicates that the difference is significant in the predicted direction at a level of significance too small to be shown in the table (51). This difference is therefore highly unlikely to be due to chance alone, and it may be concluded that an estimated 547 employees believe that they have bettered themselves by an average of over \$150 per month by taking a catalyzed job in preference to their former job.

Employee Residency. Question 10 of the Funded Project Questionnaire permits a straightforward presentation of the proportion of employees working for evaluated employers whose residence was, at the time of interview, a growth center county, RA county, other SODA county, or outside SODA. A comparison with the same percentages from an EDA-catalyzed employer located within the RA (Atoka, in fact) quickly settled the issue of where employees reside. As can be seen in Table XXIX, by far a greater proportion of RA residents are employed by the RA employer than by GC employers. A simple explanation is that RA residents live closer to the RA employer than to employers in GCs. A simple conclusion also looks possible: induce the employment to locate geographically in the center of the area in which it is desired to create employment.

Although this basic conclusion may be correct, it is questionable whether the location of a major employer outside the designated growth

TABLE XXIX
RESIDENCY OF EVALUATED PROJECT
EMPLOYEES

	Total Employment	Residency Percentages			
		GC County	RA County	Other SODA	Outside SODA
Employers Located in GC	842	83.3	10.2	1.9	4.6
Employer Located in RA	119	1.7	96.6	0.0	1.7

Source: Question 10, Funded Project Questionnaire.

centers is consistent with the growth center concept in the first place. Several respondents commented that they hoped this study would support the success the employer was having in the RA community, and thus trigger the construction of new outlets by some of the nationally known firms already located in SODA's growth centers. These comments seem to indicate that RA residents are aware that Atoka lacks the infrastructure development already existing in SODA's growth centers. Had the employer located in one of the growth centers instead, extant infrastructure could have been utilized. Moreover, several respondents indicated that they believed Atoka should also be a growth center. Thus, the conflict brought out in the first chapter between residents of growth centers and residents of communities too small to receive GC designation is highlighted. It is against human nature to expect residents of a community to favor the discriminatory GC strategy with much fervor when their community is left out of the picture. The growth center strategy is not invalidated because workers choose employment closer to home when good opportunities are available. The fundamental problem remains: federal development dollars are not sufficient to develop infrastructure in every community. Since residency statistics do not reveal the extent of migration or commuting involved, a closer look needs to be taken.

Dimensions of migration and commuting seem to be of particular interest, as evidenced by Summers' compilation of industrial impact studies. He states in his conclusions to Chapter Four, "The information in these studies points to migration as the key to the analysis of demographic impacts of the industrial invasion of rural areas in the United

States" (71, p. 4-43). The Employee Questionnaire is designed to examine facets of both migration and commuting.

Migration Effects. If the new jobs are filled by migrants from areas outside SODA, then the jobs cannot be filled by existing residents among whom are the unemployed and underemployed the growth center strategy is to help. Therefore, the proportion of evaluated jobs filled by migrants is of interest. Table XXX contains percentages reflecting the residency status of 961 employees derived from expanded Employee Questionnaire tabulations. The estimates tabulated indicate that about 14.5 percent of the employees migrated between their former and present job (7.0 percent making nonjob-related moves plus 2.0 percent returnees plus 5.5 percent nonreturnees). However, only 7.5 percent of them were making job-related moves (2.0 percent returnees plus 5.5 percent nonreturnees). Further perspective is provided by Summers.

Summarizing 11 studies considering the migration question, Summers (71, p. 4-12) comments that, "An average of 30 percent of the work force (range 11% to 69%) had moved into the vicinity of the plant to take the new jobs." Seven of the studies reviewed considered the origin of the migrating workers in even greater detail; and Summers (71, p. 4-13) concluded that, "An average of 32 percent of all migrating workers (range 8% - 69%) had come from places outside the county where the plant was located." Summers (71, p. 4-13) found, in three studies considering migration distances that, "An average of 68 percent (range 67% - 69%) of the migrants had moved fifty miles or fewer."

Other facets of migration are also of interest, but are not as well documented by previous research. Summers (71, p. 4-15) asserts that

TABLE XXX

PERCENTAGE DISTRIBUTION OF RESIDENT GC EMPLOYEES
BY LOCATION OF RESIDENCY AND MIGRANT GC
EMPLOYEES BY FORMER RESIDENCY

Nonmovers Who Are Residents ^{1/}		
Of a GC		35.3
Of a GC county, not GC		25.2
Of a RA county		20.2
Of another SODA county		1.5
Outside SODA		3.3
Movers Making Nonjob-Related Moves ^{2/}		
Total		7.0
Movers Making Job-Related Moves to GC Jobs ^{3/}		
	Returnees Originally Residing ^{4/}	Nonreturnees Originally Residing
Within GC county	0.1	1.2
Within RA county	0.3	1.3
Within another SODA county	0.0	1.2
Outside SODA, within Oklahoma	0.2	0.5
Outside SODA, within adjacent states	1.4	0.4
Outside SODA & adjacent states	0.0	0.9
Total	2.0	5.5

Source: Employee Questionnaire tabulations expanded to estimate total evaluated jobs.

- Notes: 1/ Nonmovers are respondents living in the same community they were when they started their present job (see question 2).
- 2/ Movers are respondents that have moved since starting their present job. They answered question 2 with no. A total of 14.5 percent of the respondents made either nonjob-related moves (7.0 percent) or job-related moves (total of returnee and nonreturnee proportions is 7.5 percent).
- 3/ Movers making nonjob-related moves are respondents answering question 2 with no and question 2(b) with no, whereas job-related movers answered question 2(b) with yes. Only job-related moves should be attributed to catalyzed jobs.
- 4/ Respondents making job-related moves who are returnees indicated in question 16 that the present job permitted them to move closer to home or gave some similar indication during interviews.

migrants from longer distances tend to be managerial personnel with higher incomes, better educations, and holding highly skilled, top salaried positions. Additionally, Summers cites a study by Olsen and Kuehn (48) that discusses these questions in details directly applicable to the present study, particularly the phenomenon of the returning former resident.

In their study, Migrant Response to Industrialization in Four Rural Areas, 1965-1970, Olsen and Kuehn (O&K) (48), surveyed 1,275 of 6,729 employees at 26 plants in four multicounty areas in Arizona, Mississippi, the Central Ozarks, and Arkansas. Sample values were then expanded for each plant to reflect total estimated employment. Their general conclusion is that about 78 percent of the new jobs went to local residents and about 22 percent were equally divided between new and returning in-migrants. Thus, about 11 percent of the migrants were returning former residents. Additionally, O&K (48, p. iv) generalize, ". . . that the immigrants were younger and better educated . . . and had shown greater job mobility in previous years than residents." The immigrants, thus, had a competitive advantage over residents.

The reason the O&K study is relevant is that the study region they have labeled "the Ozarks" contains eight counties geographically close to the SODA area: Benton, Carroll, Madison, and Washington in Arkansas; Barry and McDonald in Missouri; and Adair and Delaware in Oklahoma. Although specific geographic locations of the plants surveyed were not given, none appear to have been in Oklahoma. Nevertheless, a few of O&K's Ozarks statistics may prove more comparable than either their own or Summers' generalities.

Olsen and Kuehn estimated that 1,980 of 6,729 employees lived in their Ozarks region. Moreover, of the 1,980, O&K (48, p. 9) estimated 31.5 percent of them to be in-migrants, split between 18.8 percent non-return and 12.7 percent returning former residents. The 31.5 percent is comparable with O&K's generalized 22 percent, and the 12.7 percent is comparable with the 11 percent generalization. Thus, both the in-migrant proportion and the proportion of returning former residents for the Ozarks area are about 1.5 percentage points greater than the corresponding generalized proportions.

At least two concluding comments comparing the percentages of Table XXX with those reflected in the literature seem noteworthy. First, a greater proportion of the new jobs are held by local SODA residents than is indicated in the other studies. Conversely, a smaller proportion of the SODA jobs are held by in-migrants (14.5 percent). Second, although the other studies highlighted the phenomenon of the returning former resident, no mention was made of the proportion of the migrants making nonjob-related moves. As is indicated in Table XXX, movers making nonjob-related moves account for about half the migrant percentage. Moreover, only two percentage points of the remaining seven and a half are attributable to returning former residents. Thus, the returning former resident phenomenon does not appear particularly important to the firms studied in the SODA area. Consider next the extent of commuting.

Commuting Effects. The journey-to-work can be measured with the Employee Questionnaire in terms of both time and distance. However, Summers (71, p. 4-5) suggests that discussion in distance terms is more accurate, because the researcher is able to obtain map distances

whereas travel times are obtained from interview responses and are thus subject to memory vagaries. Since automobile is the only mode of transportation indicated by respondents, highway map distance is a more appropriate measure than air distance.

Summers cites 24 studies discussing commuting, although few provide comparable information. Only two (unspecified) studies discuss commuting in terms of time. The median commuting time mentioned in Summers' study is 20 minutes or less, whereas the corresponding figure, estimated from the SODA survey, is 16 minutes or less.

Table XXXI and Table XXXII present one-way commuting distances based on sample estimates in terms as nearly comparable with other studies as possible. Summers combined the results from four studies finding that the proportion of workers journeying four road miles or less ranged from 11 percent to 67.6 percent and averaged 37.9 percent. Five more (unspecified) studies were found to have an average one-way commuting distance ranging from 3.2 to 19 miles, with a mid-range of 11.1 miles.

Olsen and Kuehn (O&K) (48) also consider commuting. Figures comparable to Summers' classification can be calculated from their Table 13 (48, p. 17) for their Ozarks region. They estimate 1956 of the employees of the Ozarks firms they surveyed could be classified as commuters, of which 42.0 percent commute 4 road miles or less, and 62.9 percent commute 10 miles or less. The average one-way commuting distance is about 9.2 miles. Greater detail is given in Table XXXII.

As can be seen in Table XXXI, a greater proportion of the SODA region employees travel the short distances than do the employees surveyed in the other studies. Moreover, the average distance traveled is almost two miles less than the average distance traveled by employees

TABLE XXXI
 SUMMARY OF COMPARABLE (?)
 COMMUTING TRENDS

One-Way Mileage	Summers Review	Olsen & Kuehn (Ozarks Region)	SODA Evaluated Firms
Four or less	*37.9%	***42.0%	58.6%
Ten or Less	**46.6%	***62.8%	67.6%
Mean Distance	**11.1 miles	# 9.2 miles	7.4 miles

Sources: (Summers) Gene F. Summers, Industrial Invasion of Nonmetropolitan America: A Quarter Century of Experience, U.S. Department of Commerce, Economic Development Administration, September, 1975, pp. 4-25.

(Olsen) Duane A. Olsen, Migrant Response to Industrialization in Four Rural Areas, U.S.D.A. Economic Research Service, Agricultural Economic Research Service, Agricultural Economic Report 270, September, 1974, Table 13, p. 17.

(SODA) SODA data is from Employee Questionnaire question 1 compared with question 6.

Notes: *Four Study Average
 **Mid-range
 ***Directly computed from O&K Table 13, p. 17.
 #Directly computed from above, all in mileage interval assumed to fall on interval mid-point. See text.

TABLE XXXII
 PERCENTAGE DISTRIBUTION OF EMPLOYEE
 COMMUTING DISTANCES: OLSEN &
 KUEHN'S OZARKS VS. SODA

One-Way Mileage	O&K's Ozarks	SODA Area
0-4	42.0	58.6
5-9	20.9	9.0
10-19	25.0	15.4
20-29	8.6	15.8
30-39	2.5	1.2
40 or more	0.6	0.0
Undetermined	0.4	0.0
Total (%)	100.0	100.0
Total Number	1956	961

Source: (O&K) See Olsen, cited previously in Table XXXI.

(SODA Area) See SODA data, cited previously in
 Table XXXI.

in O&K's Ozarks region. A similar conclusion is reached upon examination of Table XXXII, which distributes SODA commuting distances into mileage classes identical to those used in O&K's Table 13 (48, p. 17).

The reader may be tempted to conclude that the drawing ability of the growth centers is weak, or that SODA employees are particularly tied to their locations in Cameron's sense (*supra*, p. 17). Such is not necessarily the case, because this survey reflects the residency of employees of evaluated firms only. It is likely that a goodly number of Durant-area residents hold jobs in the rapidly growing Denison-Sherman industrial area and, thus, commute daily about 30 miles one way. All that can be concluded is that the employees of firms evaluated travel a shorter distance, on the average, than is reflected in the other studies reviewed.

Effects on Formerly Disadvantaged Employees

An underlying assumption of policies emphasizing job creation is that a sizeable proportion of the employees going to work for the new firms will come from the ranks of the disadvantaged (the unemployed, underemployed, unskilled, poorly educated, racial minorities, etc.). For example, SODA unemployment rates, especially RA county rates, have a long-term tendency to be higher than the national rates (*supra*, p. 49). In searching for verification of this assumption, Summers (71, p. 4-1) points out that the important question is not how many jobs were created, but who gets them. Therefore, this section focuses on the participation of the disadvantaged in the newly created jobs.

A study by Kuehn (32) is a recent source of comparisons. The sample data and geographic coverage are identical with the Olsen (48) study

previously discussed, and thus Kuehn's Ozarks area statistics may provide more comparable data than combined results for his four study areas.

Kuehn (83) defined poverty thresholds utilizing Office of Economic Opportunity guidelines in a manner similar to those used in the EDA study. Poverty thresholds were defined by Kuehn (30):

. . . as \$2,000 for the first member (employee) plus \$600 for each additional member per year Changes in poverty status were based on annual household income in 1970 in the previous job versus annual household income in the most recent previous job held. If no such job existed, 1965 household income was used for comparison. All incomes were inflated to a 1970 base year with the Consumer Price Index to remove effects of yearly variations in price levels. The 1970 household size was used for poverty calculations (p. 5).

Notice in this definition that the current family size is used with previous household income, as was also the case in the EDA study (83).

Strictly speaking, family size should coincide timewise with household income.

The comparative statistics in Table XXXIII indicate that the poor share in jobs created in new and expanded firms: 26 percent of jobs (for which Kuehn could determine poverty status) were filled by previously poor, all areas combined, and 20 percent, Ozarks area only. The new jobs in the SODA area are filled to an even greater extent by previously poor or unemployed. The expanded sample indicates that 35.8 percent of the 918 determined jobs were so filled.

The new jobs, moreover, appear capable of helping the poor escape poverty. Of those in Kuehn's four areas, 64 percent elevated themselves above poverty (16.5/25.8). SODA's record is more impressive, because 74 percent (26.4/35.8) escaped poverty.

Portraying only success is unrealistic, because it is possible to move into poverty as well as to escape it. Whereas, 3 to 4 percent of

TABLE XXXIII
 COMPARATIVE STATISTICS: EFFECTS OF JOB
 DEVELOPMENT ON POVERTY STATUS

	Kuehn's Four Areas Combined Number	Kuehn's Ozarks Area	SODA Firms	
			EDA Study	Present Study ^{1/}
Total Number of Jobs	6,729	1,980	275	961
Number of Determined Jobs ^{2/}	5,122	1,572	275	918
As a Percentage of Determined Jobs ^{2/}				
Total Previously Unemployed	18.2	12.0	---	22.3
Total Previously Poor or Unemployed	25.8	19.8	13.5	35.8
Residents ^{3/} Previously Poor	21.9	14.5	11.6	27.5
Total Escaping Poverty	16.5	13.9	---	26.4
Residents ^{3/} Escaping Poverty	13.3	9.1	---	26.4
Total Moving into Poverty	3.1	4.6	---	2.1
Residents ^{3/} Moving into Poverty	2.2	2.8	---	2.1

Source: (Kuehn) John A. Kuehn. Impact of Job Development on Poverty in Four Developing Areas, 1970. U.S.D.A., Economic Research Service, Agricultural Economic Report No. 225, Washington, D.C., 1972, Table 3, p. 1, Table 6, p. 11.

(EDA) U.S.D.C., EDA. Program Evaluation: The Economic Development Administration Growth Center Strategy. U.S.D.C., Feb., 1972, T4, p. 31.

(SODA) Employee Questionnaires expanded by plants; employee sample assumed representative of unsampled employees.

- Notes: ^{1/} Total number of jobs in nine firms allowing employees to participate in Employee Questionnaire.
- ^{2/} Determined jobs are cases for which poverty status for both previous and present jobs are determinable. --- Denotes figure unavailable; EDA figures may not be comparable since complete classification definitions were unavailable.
- ^{3/} Residents, as defined by Kuehn (op. cit., p. 4), consisted of nonmovers and movers within the study areas.

more workers. As of 1976, approximately 81 percent of all estimated employed persons were covered by a UI program, and thus included in the report. Major federal changes were adopted about the same time in Oklahoma. Since the type of comparison to be made is state, GC, and RA counties, relative to the nation, distorting effects of the legislative changes discussed above should cancel out, for any particular year.

Another problem with the series, as presented, is that the information represents the impact of all covered employers averaged together. Presentation of UI earnings information is not intended to imply that the trends exhibited therein are to be attributed solely to the EDA-catalyzed jobs. Although the data source has within it the capability for such a comparison, researchers are not privy to the original data because of disclosure rules. Since this study attempts to focus on the wage and earnings effects of the EDA-catalyzed jobs (in SODA) on the workers holding those jobs, the aggregate UI earnings information tends to blur the focus somewhat. Nevertheless, relative computations are presented in Figure 12, and analytical comments follow.

Quite simply, parity with national weekly wages has not been achieved, not even for the state. The RA counties continue to lag the GC counties, Oklahoma, and the nation. Tendencies to "catch up" have become evident only since 1972 and then most obviously in the GC counties. Lest the reader be tempted to rationalize the recent trend toward convergence as attributable to a national recession into which the regional areas fail to follow, the National Bureau of Economic Research (NBER) business cycle turning points are represented by the shaded areas. Thus, it can be seen that the relative upturn of regional wages began in a period of national expansion, instead of contraction. If, however, a

the persons holding determined jobs (in the studies reviewed) moved into poverty, only 2 percent slid backward in the SODA area.

The reader may recall that the first digit of the OGA delineates occupation categories roughly ranking occupations in descending order of status (*supra*, p. 144). Table XXXIV presents selected socioeconomic characteristics of respondents, expanded to represent total employment of evaluated firms and distributed percentagewise by the first digit of the OGA. Thus, the relationship between socioeconomic traits used to indicate status of the disadvantaged and an indicator of the status of the position presently being filled can be ascertained.

Trends evident in Table XXXIV add substance to the belief that the sample is representative of the population sampled. For example, the preponderance of the jobs are held by males, who also hold the preponderance of managerial positions. Additionally, the bulk of male workers are employed in machine trades (OGA 6) and structural work (OGA 8) whereas the bulk of the females are employed in processing (OGA 5) and bench (OGA 7) occupations.

Even though detailed racial information was obtained on the Employee Questionnaire, the detail is not particularly useful because there were relatively few minority-class employees. Therefore, Table XXXIV simply classifies race as either white or minority. Although the bulk of all employees are holding jobs in nonprofessional and nonmanagerial occupations (OGAs 5-9), the whites dominate the managerial occupations.

A high level of formal education has not been attained by most of the employees. About 68 percent have no more than a high school education. Moreover, the bulk of these employees are employed in the non-professional, nonmanagerial occupations. Although holders of college

TABLE XXXIV

SELECTED SOCIOECONOMIC CHARACTERISTICS OF EMPLOYEES
DISTRIBUTED BY SKILL INDICATOR OF PRESENT JOB

DOT OGA First Digit	Indicator of Disadvantage														Previously ^{1/} Unemployed or Escaping Poverty		
	Sex		Race		Educational Level Attained				Marital Status of Jobs Filled by Household Head				Previously ^{1/} Unemployed or Underemployed		Previously ^{1/} Unemployed or Escaping Poverty		
	Male	Female	White	Minority	No Degree	H.S. Degree	Some College	B.S. Plus	Now Married	Widowed	Divorced/ Separated	Never Married	GC	RA	GC	RA	
0,1	3.1	0.3	3.4	0.0	0.0	0.8	1.2	0.8	0.6	2.8	0.0	0.3	0.0	0.0	0.2	0.0	0.2
2	1.6	1.1	2.3	0.4	0.0	1.1	1.4	0.2	0.0	0.0	0.2	0.7	1.2	0.2	0.0	0.2	0.0
3	2.3	0.0	2.4	0.0	0.0	1.2	1.2	0.0	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0
4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	8.2	10.0	15.2	3.2	5.5	8.4	2.2	2.2	0.0	3.5	0.0	2.0	1.2	6.5	0.0	6.5	0.0
6	26.1	3.1	27.0	2.2	6.0	12.4	10.9	0.0	0.0	18.4	1.0	3.2	3.1	10.3	0.0	10.3	0.0
7	10.4	11.3	19.7	2.0	5.3	10.7	5.8	0.0	0.0	7.0	0.0	1.1	1.2	5.7	3.4	4.6	3.4
8	15.4	0.0	14.4	1.1	3.2	8.0	4.3	0.0	0.0	14.4	0.0	0.0	1.1	5.7	1.1	4.6	1.1
9	5.8	1.0	3.4	3.4	1.2	4.6	1.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	702	259	844	117	204	454	268	30	5	498	12	82	75	261	43	240	43
Proportion	73.0	27.0	87.8	12.2	21.2	47.2	27.9	3.1	0.6	51.9	1.2	8.5	7.8	28.4	4.7	26.2	4.7

Source: Employee Questionnaire

Notes: Figures are expansions of firm samples, sample responses are assumed typical of unsampled responses, and represent determined jobs as defined in notes to Table XXXIII.
^{1/}Based on sample responses, previous and present poverty status were determined for 918 jobs.

degrees are few in number, with the exception of processing (OGA 5), they hold the managerial positions.

Approximately 70 percent of the employees are heads of households, the majority of whom are presently married. As can also be observed in the sex, race, and education level tabulations, the household heads hold largely nonprofessional and nonmanagerial occupations. Moreover, the occupational distribution of the presently married household heads (the subclassification accounting for the bulk of household heads) is not noticeably different from the distribution of the other socioeconomic characteristics.

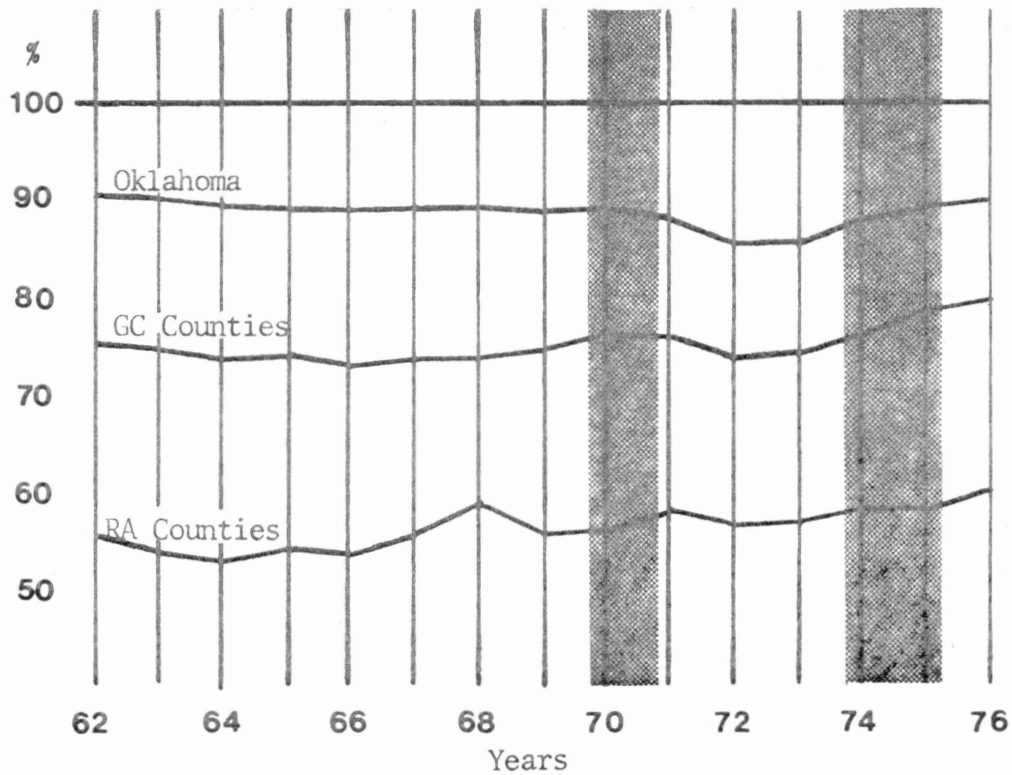
Sample responses representing 918 of the 961 evaluated firm jobs allowed both present and previous poverty status to be determined. Of these, about 33 percent were either unemployed or underemployed immediately before taking the present job. Moreover, these employees hold nonprofessional, nonmanagerial jobs. Since 31 percent of the 918 have escaped poverty, about 94 percent (31/33) of the previously underemployed or unemployed have escaped poverty.⁷

Table XXXIV thus generally indicates that the employees of the firms interviewed are white, male, heads of households. They have a high school or lower level of formal education. They hold jobs in the nonmanagerial, nonprofessional occupations. About a third of them were unemployed or had total incomes below the poverty level immediately before taking the job held at interview time. At least for this third, the quality of life, in income terms, should have improved, because almost all of them have escaped poverty.

Temporal Comparison of GC, RA, and
National Wages

The tests that have been conducted have so far been restricted to ascertaining wage rate and earnings effects. Evidence of the trend in earnings over time for GC counties and RA counties relative to the nation is available. Employment and wage data for workers covered by state unemployment insurance laws are collected and compiled by the Research and Planning Division of the Oklahoma State Employment Service. Employers subject to state unemployment insurance laws submit quarterly ES-202 (or equivalent) reports containing data on monthly employment, and quarterly total and taxable wages. The data are summarized by the state agencies, forwarded to the Bureau of Labor Statistics, and then published quarterly in *Employment and Wages*. Annual averages appear in the fourth quarter issue.

This data source has interesting properties. As discussed in the Bureau of Labor Statistics (BLS) Handbook of Methods, "Since the data are secured incident to the collection of UI taxes and comprise a universe count of employees covered by those taxes, the report is not subject to sampling variability" (84, p. 70). However, comparability of the data over time is questionable, because the Federal Unemployment Insurance Tax Act initially (in 1938) applied only to firms employing at least 8 persons in 20 weeks in a calendar year and excluded many categories of workers--notably federal, state, and local employees. Coverage was extended to federal civilian employees in January, 1955, and to employers employing 4 or more persons in 20 weeks of a calendar year. Coverage was extended again in January, 1972, to firms employing one or



Sources: (National) U.S. Department of Labor, Bureau of Labor Statistics, Employment and Wages, Fourth Quarter Edition, Table A-1. (State & County) Oklahoma Employment Security Commission, Research and Planning Division, County Employment and Wage Data, annual editions for respective years, Table 2. (Business Cycle Turning Points) Defined by National Bureau of Economic Research.

Figure 12. Average Weekly Wages of UI Covered Workers as a Percentage of U.S. Average

move toward national wage parity in the state, GC, and RA counties was only begun in 1972, and is more or less attributable to EDA efforts, then evaluation attempts made in 1970 were far too early, and there is still a long way to go.

Summary

A recapitulation of the findings in this chapter is in order. First, by reviewing PAP documents and descriptive statistics of EDA-funded projects, it was demonstrated that at least a pragmatic growth center policy has been followed in SODA. Second, brief project-by-project sketches revealed instances where an earlier study of the SODA area had underestimated job counts. Considerable growth of permanent jobs at EDA-funded sites was also indicated. Third, the results of a stratified random sample of the employees holding jobs at firms located on EDA-funded sites was analyzed. This analysis is entitled "Direct Effects of Evaluated Firms" because no effort is made to assess the effects the catalyzed jobs might be having on the public at large. A multidimensional analysis has been conducted, because no one dimension adequately captures all effects of the catalyzed jobs.

The first dimension analyzed is the effect on employees previously employed and previously (and presently) paid on an hourly basis. The conclusion is reached that there are no significant real wage rate differences that are not accounted for by the nature of the firm for which the employee works, by a shift in job status or to other factors related to time elapsing between the previous endeavor and the interview date. Real minimum wage rate differences are not significant in explaining the real wage rate differences of the qualifying respondents.

Earning effects are considered second. On the average, the mean earnings of holders of catalyzed jobs who were previously unemployed are estimated to be \$581.91 per month, and of the previously employed, to be \$707.20 per month. Moreover, the previously employed feel that they are earning, on the average, about \$150 per month more in the catalyzed job than they would be earning if they still held the previous job.

The third dimension considered is employee residency. It is concluded that the majority of the employees live within the county (most within the community) where their job is located.

Migration effects are discussed after residency. Although several other studies found in-migrants (including returning former residents) to be holding about one-quarter of the catalyzed jobs, only about 14 percent of the (SODA) evaluated firms' jobs are held by in-migrants. Only two percent of all the (SODA) jobs are filled by returning former residents. The average one-way distance employees of the evaluated firms commute is about seven miles, whereas the average in other studies is about nine miles. The shorter distance SODA employees commute reflects the fact that more of the employees reside in the county in which their employer is located than appears to be the case in other studies.

The last dimension considered is the extent to which the employee holding an evaluated firm job is formerly disadvantaged. Almost 36 percent of the "determined" jobs are filled by employees either previously poor or unemployed, as compared with about 25 percent in other studies reviewed. About 74 percent of these previously poor employees had escaped poverty by interview time. The general conclusion is that the catalyzed job opportunities provided by the evaluated firms are largely held by local residents, a goodly proportion of whom are previously poor

or unemployed. Although but a small proportion of these job holders are (or were) RA residents, one can hardly expect a growth center community to be voluntarily indifferent to its own disadvantaged citizens in preference to out-of-town residents. Moreover, a comparison of EDC, RA, and national average weekly wages shows that any tendency for wages to converge toward national averages has begun only since 1972, and has a long way to go. Thus, evaluation efforts made in the SODA area in 1970 were at least premature.

Direct effects are not the only effects of catalyzed jobs. Secondary effects are generated by firms' payrolls and by purchases of other manufacturing inputs and services. Chapter Five attempts to assess these secondary effects.

ENDNOTES

¹Ardmore devotes more fulltime resources to the industrial hunt than the other growth centers. Mr. Jess Craig is fulltime director of the Ardmore Development Authority. He and his secretary work closely with the Ardmore Chamber of Commerce to keep the Ardmore Industrial Team primed for action with the latest Ardmore, Ardmore Air Park, and area statistics. Although Ada and Durant also have industrial teams as active components of their Chambers of Commerce, neither town has a separate fulltime office devoted to seeking new industry. Credit is gratefully given to the Ardmore Development Authority for supplying the raw data upon which this analysis is based.

²Since not all Airpark employers participated in the surveys, comments about potential nonresponse bias are appropriate. Airpark employment accounted for on the 1973 survey summary sheet (5) is 911, and total Airpark employment shown in Table XXII is 1,003. Thus, about 91 percent of the total is covered by the survey response. Similarly, 648 Airpark employees were accounted for on the 1976 survey summary sheet (6), and total Airpark employment shown in Table XXII is 707. Thus, about 92 percent of the 1976 total is covered by survey response. Because these response rates are quite high, nonresponse bias is assumed immaterial in the following analysis.

³Niles Hansen (28, p. 151) classifies overhead capital into social overhead capital (SOC) and economic overhead capital (EOC). The term "infrastructure" may be considered a synonym for overhead capital. SOC projects are termed "environmental" projects by the EDA and primarily enhance the quality of life available to residents of a community. Three completed projects (viz., Arbuckle Lake pollution control, Ada retail parking, and Tishomingo sewage collection and treatment) and several recently announced, but unfinished projects (viz., Kalihoma retreat for the Chickasaw Indian Nation, Atoka's high school expansion, and Bokchito's new City Hall) are of this type. Although the funding of SOC projects is within EDA's authority, most of the projects are more EOC in nature because they support directly productive job-creating activity. Since any given project may serve both purposes, the distinction is perhaps more pedagogical than analytic.

⁴Sample size, confidence, and estimate precision are interrelated. Some studies choose to predetermine the confidence level and desired precision of the estimate, and then solve for the sample size needed. The method used herein was first to examine recently-completed surveys of a related nature to determine the sample size used. For example, in

SODA the field team conducting the EDA study distributed questionnaires to only 15 percent of the Peabody hourly wage employees (30 questionnaires) of which 11 percent (21 questionnaires) were returned (80, p. 2-30). Olsen and Kuehn (48, p. 3) attempted to interview 25 percent of their firms' employees (1,275 out of 6,729), but only about 19 percent returned usable questionnaires. It was concluded that the technique of explaining the survey to potential respondents and then leaving them to be completed and mail-returned later saved employer time but decreased the response rate. Therefore, it was decided to conduct interviews on the job, begin with a lower sample proportion, and attempt to achieve a higher response rate with less potential nonresponse bias.

The Oklahoma Directory of Manufacturers (46) was next consulted to determine the approximate size of the population (the number of employees listed for firms whose addresses indicated they were located on project sites). A total of 4,660 jobs were thought project attributable, although several firms later proved nonattributable, nonexistent or uncooperative. Ten percent of the total (466) was chosen for planning purposes and the cost of designing, testing, interviewing, editing, and tabulating a survey of this size estimated. The out-of-pocket estimate was \$4,600, not counting foregone job earnings resulting from the necessity of taking a sabbatical leave. Since 10 percent is a convenient figure with which to work, and also \$4,600 was an almost prohibitive figure, the author decided to predetermine the sample size and confidence levels and let the precision be determined (See Appendix C).

⁵Further stratification was possibly desirable, for example, by race. However, 6 additional race categories superimposed upon 14 job/sex categories would present personnel managers with 84 stratification cells--a burdensome number.

⁶For example, the Manufacturing Division encompasses SIC two-digit codes 20-39. One of its major groups is 35: Machinery, Except Electrical. Two (three-digit) industry groups within major group 35 are Construction, Mining, and Materials Handling Machinery and Equipment (353) and General Industrial Machinery and Equipment (356). One of the industries within industry group 353 is 3536, which is the hoist, crane, and monorail manufacturing industry.

⁷The reader may have noticed that the total previously poor or unemployed is shown to be 35.8 percent of the 918 determined jobs in Table XXXIII, but only 33.1 percent in Table XXXIV. Similarly, 74 percent of the previously poor escaped poverty in Table XXXIII, and 94 percent are shown escaping poverty in Table XXXIV. The difference between these percentages, that at first glance should be the same, is explained by the fact that Table XXXIII is based on all respondents, whereas the previously poor or unemployed columns of Table XXXIV are based on respondents residing only in GCs or RA counties.

CHAPTER V

MULTIPLIER EFFECTS OF EVALUATED FIRMS

The multiplier effect is useful for explaining benefits generated in the SODA economy by the evaluated firms. Economic benefits are not limited to the wages paid directly to employees or to local purchases of manufacturing inputs because employer expenditures become employee and supplier receipts, most of which are respent. This income-expenditure process continues until initial expenditures ultimately leak outside the SODA economy. The purpose of this chapter is to utilize readily available multipliers recently estimated for the SODA district to provide estimates of the total employment and income impact of the SODA evaluated firms (61)(62).

Comments on Conventional Wisdoms

Summers (71) has compiled significant findings of past multiplier studies. A summary table presents employment multipliers for 18 studies (71, p. 5-11). These multipliers range in value from 1.00 to 1.71. A multiplier of 1.71, for example, implies that 71 more people are employed in nonmanufacturing for every 100 manufacturing jobs. Thus, one multiplier does not apply to all times, places, or industries. Research does, however, support tentative conclusions about the dependency of the size of multipliers on various attributes.

Three such attributes upon which the size of an economy's multipliers depend are the degree of the economy's interdependence, its geographic size, and its extant excess business capacity. Generally, the more interdependent the economy, the larger the multiplier because leakages from its income-expenditure stream are less likely (71, p. 5-12). Similarly, for a given degree of interdependence, the larger an economy's geographic size, the larger its multipliers because leakages tend to be internalized by the expansion of geographic boundaries. For example, a leakage caused by spending paychecks in communities outside the economy of concern can be eliminated by redefining the economy's boundaries to include these communities (71, p. 5-13). Moreover, smaller multiplier effects may be expected from new firms locating in towns with excess business capacity, unemployment, and underemployment because existing firms can handle expanded business for awhile without adding employees (71, p. 5-14). Conversely, larger multiplier effects derive from firms demanding more inputs from the economy of concern than from one importing its inputs from outside because the more backward and forward linkages a firm has with an economy, the more interrelated it is with the economy.

Quantification of interdependence and of multiplier size is a controversial area of econometrics in which this study will not become embroiled. However, the characteristics of SODA's economy presented in Chapter Three in conjunction with the observation that labor is the most important purchase made by the evaluated firms give an intuitive feeling that SODA's economy is not highly interdependent and that firms are linked to SODA's economy mostly through their payrolls. Thus, multiplier

effects are probably not as strong as they would be in more industrialized and self-sufficient areas.

An Input-Output Approach

Dean Schreiner and James Chang (61) have constructed input-output models for all of Oklahoma's substate planning districts. The basic ideas behind input-output economics are the same as for simple multiplier analysis, although in the former final demand and income flows are disaggregated and in the later, the flows are aggregated. All input-output systems feature a detailed interindustry transactions table that relates the flows of goods and services required from one sector (or industry) by another. This table describes in detail the interrelationships present within the subject economy, and permits the cumulative repercussions of changes undertaken by one of the economy's many economic actors on the others to be measured. Schreiner's (61, p. 22) transactions table for the SODA area, for example, contains 20 producing sectors selling their outputs to themselves and 8 final demand sectors. Multipliers for each sector can be derived by solving the set of simultaneous linear equations embodied in the input-output framework and thereby obtaining the table of direct and indirect coefficients (usually called interdependence coefficients). The input-output multipliers still serve the same purpose as simple multipliers, "to indicate the relationships between some observed change in economic activity created throughout the economy" (23, p. 10).

Three types of multipliers, each having two basic forms, are commonly mentioned in conjunction with input-output analysis. These are computable for input-output models regardless of the model's geographic

coverage. The three multipliers are output, income, and employment. Each can be calculated as a Type I or Type II multiplier.

The output multiplier is computed directly from the table of interdependence coefficients. Whereas in simple multiplier analysis, only one aggregate multiplier is computable, with an input-output model, a separate multiplier is computed for each producing sector. Thus, for the 20 producing sectors, 20 output multipliers can be computed, as can be seen in column two of Table XXXV. Each output multiplier gives the dollar change in total output of the SODA economy resulting from a one dollar change in final demand for the products of that sector (23, p. 10). Ethan Allen, for example, manufactures furniture in Atoka, Oklahoma, and is a member of manufacturing sector six: lumber, wood, and furniture. The output multiplier for sector six (Table XXXV) is 1.16609. Thus for every \$1.00 of increase in final demand for the Atoka plant's furniture, about \$1.17 of total output is created within the SODA district.

Conventionally, the remuneration of productive factors (land, labor, capital, and entrepreneurial ability) is income in the form of rent, wages, interest, and profits. Similarly, in the input-output context, households are remunerated for the resources supplied to produce output. Wages, salaries, and proprietor income comprise the major part of this remuneration and are used by Schreiner (61, p. 76) to obtain income-output coefficients. These coefficients give the dollar amount of income paid per dollar of output. There is a coefficient for each of the 20 producing sectors. The typical income multiplier for a sector is obtained by first obtaining the product of the interdependence coefficient (for the sector of interest) and the income-output coefficient (for

the same sector). The 20 products are then summed, which yields, "the total amount of direct and indirect income generated as a result of the initial one dollar change in final demand for the sector" (23, p. 12). The income multiplier is obtained by dividing the amount just computed by the sector's income-output coefficient and "indicates the total amount of income generated by the increase of one dollar of income in that sector" (23, p. 12). Income multipliers are also given in Table XXXV, except for transportation equipment, whose interaction effects in the SODA district, as reflected in the SODA interindustry transactions table are nearly zero (61, p. 227). Thus, the total direct and indirect income impact of \$1.00 of income, generated for example by Ethan Allen's payroll, on the SODA economy is (by virtue of the Sector 6, Type I income multiplier in Table XXXV) about \$1.17.

Since job-creation is a central concern of PWEDA, the SODA employment multipliers computed from the district's I-O model will be of interest. An employment multiplier is defined as "the total change in employment due to a one unit change in the employed labor force of a particular sector" (23, p. 12). Total employment used by Schreiner (61, p. 57) is wage and salary workers, proprietors, and military personnel allocated by planning district and producing sector. Computation of employment multipliers is similar to income multipliers and begins with calculation of employment-output coefficients. These coefficients give the number of employees employed per thousand dollars of output. There is a coefficient for each of the 20 producing sectors. The typical employment multiplier for a sector is obtained by first obtaining the product of the interdependence coefficient (for the sector of interest) and the employment-output coefficient (for the same sector).

The 20 products are then summed to yield the total direct and indirect employment generated as a result of a thousand dollar change in the sector's final demand. The employment multiplier is obtained by dividing the amount just computed by the sector's employment-output coefficient. Employment multipliers are also given in Table XXXV, for each sector (with the exception of transportation equipment, as explained in the income multiplier paragraph above). Thus, the total direct and indirect employment impact of hiring an additional employee at Ethan Allen (for the SODA district on the whole, by virtue of the Sector 6 Type I employment multiplier in Table XXXV) is about 1.14 employees. Another way of saying the same thing is that Ethan Allen needs to hire ten new employees if the indirect effects are going to result in one more hiring somewhere in the SODA district. Explained so far is the Type I output, income, and employment multiplier. Consider briefly next the larger and more inclusive Type II income and employment multipliers.

At the beginning of this discussion on input-output multipliers, it was mentioned that there are two forms of each type of multiplier: a Type I and Type II multiplier. Table XXXV lists Type II multipliers for income and employment, but not for output. Type II multipliers for output can be computed, but not conveniently from Schreiner (61). Since they are not needed in the following section, they were omitted.

One of the eight final demand sectors included in Schreiner's I-O models is Personal Consumption Expenditure. This means that household expenditures are being treated as if determined independently of economic activity generated within the economy being considered. When household expenditures are treated thusly and multipliers calculated, Type I multipliers result. Another way of considering the household sector is

TABLE XXXV
 OUTPUT, INCOME, AND EMPLOYMENT MULTIPLIERS
 PLANNING DISTRICT 4 (SODA)

	Multipliers				
	Output	Income		Employment	
	Type I	Type I	Type II	Type I	Type II
1. Livestock & Products	1.3748	1.3950	1.9316	1.2741	1.5563
2. Crops & Forestry	1.4863	1.5323	2.1217	1.2626	1.5726
3. Mining	1.3230	1.5353	2.1259	1.8266	3.1284
4. Food Products	1.3912	1.9997	2.7688	2.6718	3.7733
5. Textiles & Apparel	1.1179	1.1291	1.5634	1.0653	1.2933
6. Lumber, Wood & Furniture	1.1661	1.1668	1.6156	1.1431	1.6184
7. Printing & Publishing	1.2391	1.1709	1.6212	1.1600	1.7064
8. Petroleum Products	1.7687	3.1747	4.3960	3.4909	5.7901
9. Machinery	1.1349	1.1484	1.5901	1.1701	1.7987
10. Transportation Equipment	1.0000	--	--	--	--
11. Other Manufacturing	1.2404	1.2857	1.7802	1.2884	1.9775
12. Construction	1.2748	1.3446	1.8618	1.4447	2.2553
13. Transport & Warehouse	1.3068	1.2286	1.7011	1.3243	2.2819
14. Communications & Utilities	1.3739	1.3954	1.9321	1.5340	2.6977
15. Trade (Wholesale, Retail)	1.2343	1.1144	1.5431	1.0907	1.5329
16. Finance, Insur., R. Estate	1.2641	1.6424	2.2741	1.7520	2.7491
17. Business & Personal Servs.	1.2587	1.1900	1.6478	1.1782	1.7041
18. Medical & Prof'l Services	1.2600	1.1266	1.5600	1.0559	1.2967
19. Federal Govt. Enterprises	1.2205	1.1055	1.5307	1.1128	1.8434
20. State & Local Govt. Entrps.	1.4574	1.7796	2.4641	1.5100	2.1786

Source: Dean F. Schreiner and James C. Chang. Projection and Analysis of the Economies of Substate Planning Districts in Oklahoma, Ozarks Regional Commission, Stillwater, Oklahoma, September, 1974 (Output multipliers from Table F-4, p. 227; income multipliers from Table VI-1.04, p. 82; employment multipliers from Table V-1.04, p. 62).

to incorporate it within the producing sector of the I-O model; i.e., treating it as if it were the twenty-first sector. Although only 20 relevant multipliers will again be calculated, this maneuver allows overall impacts to be computed because not only are the Type I direct and indirect effects tallied but also the effects induced within the subject economy by its residents spending their incomes within the economy. The Type II multipliers that result thus incorporate all effects: direct, plus indirect plus induced (61, p. 74)(88, p. 68). These comments provide some of the rationale behind the multiplier effect, which is quantified in the next section.

Income and Employment Impact of Evaluated Firms

Questions 8 and 10 on the Funded Project Evaluation questionnaire give dollar amounts of selected direct inputs and outputs of evaluated firms and their geographic breakdown, percentagewise. These direct inputs and outputs are summarized in Table XXXVI for the ten firms completing the Funded Project Questionnaire, and represent annual totals as of the end of 1976.¹ With the exception of firms seven, eight, and nine, little output is sold directly within SODA boundaries. Only firm nine purchases even minimal manufacturing inputs from within SODA.

Other input categories reflect more local purchase. Operational supplies are supplies such as printed forms, office supplies, janitorial supplies, butane, fuel and oil for trucks, electrical conduit, and fittings, etc., but are not primary manufacturing inputs. Most of the firms use various supplies of this type, and most of them are purchased within

the district. Utilities, transportation, and payrolls are the largest input categories purchased within SODA.

Property taxes and other taxes (other than payroll taxes) are intended as a proxy for inputs of services of district governments. However, many of the evaluated firms lease their entire facilities (land, building, and equipment) from some form of tax exempt public trust or corporation. One firm pays a large sum of tax, but to the State, and this, therefore, has no direct district impact. Several NAs (not applicable) thus appear in the tax row.

The geographic pattern of sales and input purchases reflected in Table XXXVI exemplifies the low degree of interrelation between the evaluated firms and the SODA economy. Labor is their largest purchase. The I-O model constructed for SODA has already captured the interrelationship of the sectors (of which firms are members) with the region's economy in its table of interdependence coefficients (61). The income and employment multipliers will thus reflect this interdependence.

The total income impact from evaluated firms' payrolls can be obtained by summing the product of each firm's payroll and the Type II income multiplier (for the sector of which the firm is a member):

<u>Annual Payroll (Thousands)</u>		<u>Type II Multiplier</u>		<u>Income Impact</u>
\$ 712.9	x	1.7802	=	\$ 1269.1
1930.3	x	1.5901	=	3069.4
520.0	x	1.7802	=	925.6
2025.6	x	1.5901	=	3220.9
856.0	x	1.6156	=	1383.0
441.9	x	1.5634	=	690.9
327.9	x	1.5431	=	506.0
205.0	x	1.7011	=	348.7
117.8	x	1.6156	=	190.3
1800.0	x	1.7802	=	<u>3204.4</u>
				\$14808.3

TABLE XXXVI

DIRECT INPUT-OUTPUT LINKAGES OF EVALUATED
FIRMS WITH SODA ECONOMY (DOLLAR
AMOUNTS IN THOUSANDS)

Firm #	1	2	3	4	5	6	7	8	9	10
Sales (Outputs)	3125.0	9920.0	8353.0	9933.0	2800.0	725.0	4453.9	685.0	330.0	30000.0
% Direct to SODA	0	0	0	0	0	0	50	100	20	0
Inputs										
Manufacturing	700.0	3500.0	3888.0	7338.0	1104.0	136.6	2452.3	200.0	120.0	7500.0
% Direct from SODA	0	0	0	0	0	0	0	0	2	0
Operational	10.0	250.0	137.0	94.1	8.3	1.0	3.8	97.0	7.0	300.0
% Direct from SODA	100	5	50	90	60	1	100	90	100	65
Utilities	52.0	122.4	130.0	62.7	44.9	12.5	18.1	5.0	4.6	500.0
% Direct from SODA	100	100	100	100	100	100	89	100	100	100
Transportation	300.0	300.0	300.0	18.6	nil	nil	296.2	nil	5.0	345.0
% Direct from SODA	100	20	80	80	NA	NA	95	NA	100	100
Taxes (Plant)	1.5	nil	40.0	100.6	nil	nil	499.1	0.4	1.0	nil
% Direct from SODA	100	NA	100	100	NA	NA	0	100	100	NA
Payroll	712.9	1930.3	520.0	2025.6	856.0	441.9	327.9	205.0	117.8	1800.0
% Direct from SODA	72 *	67 *	60 *	72 *	70 *	75 *	76 *	68 *	73 *	Unavail

Source: (Nonpayroll) Question 10, Funded Project Questionnaire

(Payroll) Question 8, Funded Project Questionnaire; amounts are thousands of dollars.

Notes: Ten firms allowed completion of the Funded Project Questionnaire, although only nine allowed completion of the Employee Questionnaire. Nil means essentially zero. If transportation is referenced, firm's own trucks are used and transportation is included with manufacturing inputs; if taxes are referenced, firm has tax exempt loans. NA means Not Applicable, since dollar amount is essentially zero. * means proportion estimated from survey.

Of this \$14,808,300 sum, \$8,937,400 is direct effect and \$5,870,900 indirect and induced effects caused by the multiple income-expenditure process at work. Since labor is (for the evaluated firms) SODA's most important resource, consider next the total employment impact generated by the evaluated firms.

Question 10 of the Funded Project Evaluation questionnaire permits the geographic residency of the evaluated firm's employees to be ascertained. Even though the spending of employees directly employed at the firms will have total (direct, indirect, and induced) multiplier effects and thus induce further employment, not all of the employment will accrue within the SODA district. Table XXXVII lists direct employment at evaluated firms and gives the percentage breakdown of employee residency. In the calculations that follow, it will be assumed that employment effects accrue to the employee's county of residence, a fact substantiable by responses to section V of the Employee Questionnaire. Firm one will be used to illustrate computations.

Total employment impact is comprised of direct, indirect, and induced effects. Thus, for firm one, total employment impact will be:

$$\begin{array}{rclclcl} \text{(total} & & \text{(Type II employment multiplier for firm's} & & & & \\ \text{employed)} & \times & \text{sector from Table XXXV)} & & & & \\ 89 & \times & 1.9775 & = & 176.0 & & \end{array}$$

The geographic breakdown of this total will be:

<u>Geographic Location</u>	<u>(Total Employment)</u>	<u>x</u>	<u>(% Geographic Breakdown)</u>	<u>x</u>	<u>(Type II multiplier)</u>	<u>=</u>	<u>(Specific Geographic Impact)</u>
GC County	89	x	97.0	x	1.9775	=	170.5
RA County	89	x	2.0	x	1.9775	=	3.5
Other SODA	89	x	1.0	x	1.9775	=	2.0
Outside	89	x	0.0	x	1.9775	=	0.0
Total	89	x	100.0	x	1.9775	=	176.0

TABLE XXXVII
RESIDENCY OF EVALUATED FIRM
EMPLOYEES

Firm No.	1	2	3	4	5	6	7	8	9	10
Total Employed	89	213	187	229	119	84	16	12	12	306
Percentage Distribution of Residency										
GC County	97.0	92.0	66.6	81.6	1.7	88.2	75.0	91.7	83.4	80.7
RA County	2.0	3.5	14.3	17.9	96.6	8.3	0.0	8.3	8.3	3.3
Other SODA	1.0	1.0	4.8	0.0	0.0	3.5	0.0	0.0	8.3	8.5
Outside SODA	0.0	3.5	14.3	0.5	1.7	0.0	25.0	0.0	0.0	7.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Inside SODA	100.0	96.5	85.7	99.5	98.3	100.0	75.0	100.0	100.0	92.5

Source: Question 10, Funded Project Questionnaire

Note: Inside SODA percentage is sum of percentages for GC County, RA County and other SODA.

TABLE XXXVIII
 GEO-SPECIFIC TOTAL EMPLOYMENT
 IMPACT OF EVALUATED FIRMS

Firm Number	GC County	RA County	Other SODA Counties	Outside SODA	Total
1	170.5	3.5	2.0	0.0	176.0
2	352.5	13.4	3.8	13.4	383.1
3	246.3	52.9	17.7	52.9	369.8
4	336.1	73.7	0.0	2.1	411.9
5	3.3	186.0	0.0	3.3	192.6
6	95.8	9.0	3.8	0.0	108.6
7	18.4	0.0	0.0	6.1	24.5
8	25.1	2.3	0.0	0.0	27.4
9	16.2	1.6	1.6	0.0	19.4
10	488.3	20.0	51.4	45.4	605.1
Total	1752.5	362.4	80.3	123.2	2318.4

Source: Computed from Table XXXVII using Type II employment multipliers for specific sector firm belongs to from Table XXXV. See text for example calculation for firm number one.

Similar computations for the other firms yield the geo-specific total employment impact of the evaluated firms exhibited, in Table XXXVIII. The 10 evaluated firms can be credited with the creation of 2,318 total jobs. However, 1,051 are indirect or induced jobs mostly created by payroll spending (2,318 - 1,267). Moreover, not all of these jobs are created within the growth center counties, or even the SODA district. As can be observed in Table XXXVIII, 75.6 percent are located in growth center counties, 15.6 percent in RA counties, 3.5 percent in other SODA counties, and 5.3 percent outside SODA. Thus, 94.7 percent are located somewhere within the district and, of these, most within a growth center county.

Summary

This chapter serves two purposes. First, it demonstrates that I-O economics has developed to the point that I-O can be readily utilized by planning agencies at the substate level. Second, it demonstrates that through the multiplier effect the direct income and employment effects of the evaluated firms have sizeable indirect and induced effects within the SODA district. For example, the total annual payroll of the 10 SODA firms evaluated as of the end of 1976 was \$8,937,400 representing 1,267 directly created jobs, and an average weekly wage of \$135.65. However, due to the multiplier effect, the 1,267 directly created jobs yield further indirect and induced effects: another \$5,870,900 of income is generated and another 1,051 jobs created. Approximately 95 percent of the jobs are held by SODA area residents.

As large as these effects are, however, the reader is reminded that Figure 12 (supra, p. 176) hints that more needs to be done. Even though

the evidence gathered indicates that a considerable improvement in the standard of living (from an income viewpoint) has taken place for the population of evaluated firm employees, the fact that the average weekly wage for the RA counties (computed on the basis of all employees covered by unemployment insurance) fails to converge toward the national average is striking evidence that more job opportunities are needed, especially in the most depressed area of the district. However, conclusions and policy recommendations are more appropriately discussed in Chapter Six, which follows.

ENDNOTES

¹In order to maintain some degree of anonymity of the firms involved, little indication of the product they produce or their geographic location is given. Moreover, the firm number listed therein was assigned for discussion purposes and reflects neither the chronological order of their interview nor similar codes in computer files.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The three topics considered in this chapter are covered in two sections. Concluding comments are integrated with summarizing ones. Recommendations for further study and policy change are treated in a separate section.

Summary and Conclusions

The growth center strategy called for in PWEDA initially limited growth inducing aid to centers below 250,000 in population, and simplistically urged that growth centers be so selected as to border the most economically depressed counties within multicounty EDDs. The Southern Oklahoma Development Association (SODA) is one of the first EDDs in the nation to be formed under provisions of PWEDA. Thus, SODA's growth centers (Ada, Ardmore, and Durant) have been designated for most of the time that PWEDA has been in force. Therefore, the district provides a good example in which to investigate the application of the growth center strategy.

Applicability of legislation does not necessarily guarantee application. This is especially true in the case of PWEDA because it is not a punitive type of legislation. The EDA, the federal agency administering PWEDA, has therefore been an agency that responds to development

proposals originated by groups within the EDDs more so than an initiative or enforcement agency.

Although EDDs are organized under provisions of PWEDA, and the staffs of the district planning organizations receive financial support from EDA, the paid planning staff works for a board of directors comprised of a cross section of leaders residing in the counties making up the district. Thus, to determine whether or not the growth center strategy set forth in PWEDA has been implemented in SODA, evidence needs to be found that leaders in communities designated as growth centers recognize the responsibilities of center designation. Moreover, the long-term statistics reflecting project funding logically would tend to show a concentration of funded projects in SODA's growth centers. The search for such evidence begins with a review of PAP documents in the first section of Chapter Four.

PAPs were prepared by leaders in the growth center communities and were requisite to receiving EDA funding for the first projects. The PAPs supposedly set forth steps growth center leaders were willing to undertake to help unemployed and underemployed residents of the district. Several versions of the PAPs were submitted by community leaders from each SODA growth center before EDA accepted the local plans. It was concluded that the PAPs indicated that leaders in the SODA growth centers understood the responsibilities of center designation. However, continued follow-up on growth center PAPs is absent. Thus, a review of project statistics is necessary to determine if, on balance, the projects receiving funding are concentrated in the growth centers.

A review of funded project statistics follows the PAP review. Over the time period covered by this study, it is concluded that funded

projects are concentrated in the SODA growth centers, albeit not exclusively. Thus, evidence is judged strong enough to warrant concluding that a growth center strategy has been carried out in SODA, at least in a pragmatic sense.

Job creation is a main thrust of PWEDA. The principal tools are public works grants and direct business loans. In 1970, approximately three years after SODA was chartered as an EDD, a study of the results of applying the growth center strategy was made by sampling growth centers across the nation. The three SODA growth centers were included in the EDA-sponsored study. The study basically concluded that the EDA investment per job was high and that the growth center strategy was not working as it should. This conclusion is understandable, with respect to the SODA district, in light of the fact that (after corrections described) only 461 jobs were attributable to EDA-sponsored growth center projects. This first study also pointed out that several projects had only recently been completed. The study herein attempts to be comparable with the earlier study, and thus job impact is again one of the factors stressed. Results are much more encouraging, because conservatively, 2,865 jobs were found attributable to growth center projects. It may be concluded, therefore, that the earlier study was probably conducted too near to the completion of EDA-sponsored projects for their full job-creating impact to have developed.

A detailed assessment of jobs created by SODA firms directly benefiting from the projects is also attempted in Chapter Four. Survey sampling was the methodology employed. Approximately a ten percent stratified random sample of the firms' employees was interviewed. Ada and Durant firms participated, as well as an Atoka firm. Although only

two of the three growth centers were represented, they coincidentally, were the same centers represented in the earlier study. Inferences obtained from the employee survey are discussed next.

Undertaken first was an analysis of the extent to which employees were enjoying enhanced opportunity in a wage rate or earnings sense. The sample contained 34 employees who received hourly wages in both the job held at interview time, and in their immediately preceding endeavor. The real hourly wage rate for this sample averaged about 25 cents an hour higher than the hourly rate received by the same workers in their immediately preceding endeavor. This positive differential was attributed to three dominant factors (1) whether or not the worker was employed by one of the two firms surveyed that fall in SIC 35, (2) the extent of difference in the "status" of the job presently held versus the previous endeavor, (3) the number of months elapsing between the interview date and the end of the previous endeavor. The most significant of these three factors was whether or not the worker was employed by either of the firms classed in SIC 35. Since neither firm would have located where it did without assistance from an EDA-funded project, it was concluded that the EDA projects were relatively beneficial at least to the hourly employees of these firms.

Earnings are a more comprehensive measure of opportunity than are wage rates. Questions asked on the survey permitted comparisons to be made of the monthly earnings from the present job with earnings the respondent thought he would be making if he were still in his former employment. Seventy-four of the respondents qualified for the earnings analysis by being both presently and previously employed. This sample represents 547 workers presently earning an estimated average of \$707.20

per month. These same respondents claimed they would be earning only an average of \$555.11 per month if they were still working where they were before. Thus, an estimated 547 employees have increased their average monthly earnings by over \$150 per month by taking a catalyzed job in preference to their former job.

After the analysis of wage rate and earnings differences as measures of opportunity enhancement, an analysis of demographic characteristics of the respondents was undertaken. This analysis revealed that the preponderance of the respondents resided in the county within which their employer was located. Their estimated average (one-way) road commuting distance was about seven miles daily whereas similar studies reported an average of about nine miles daily.

Migration effects were considered after residency. About 14 percent of the (SODA) evaluated jobs were found to be held by in-migrants, with about 2 percent being held by returning former residents. Other studies reported that in-migrants accounted for about 25 percent of all jobs. The extent to which jobs at the evaluated firms were held by formerly disadvantaged employees was the last dimension considered. Other studies reported that about 25 percent of the employees were previously poor or unemployed. However, almost 36 percent of the "determined" jobs at the SODA evaluated firms were filled by previously poor or unemployed employees, although about 74 percent of them had escaped poverty by interview time.

The statistics cited above suggest that jobs created by the evaluated firms are held by local residents. The evidence also indicates that the jobs have been important in elevating the poor or unemployed families involved above poverty level incomes. Furthermore, it may be

concluded that the previous study was premature in finding that job creation attributable to EDA-funded projects was minimal. What explanation might be offered, however, to account for the fact that firms located in the growth centers do not seem to draw employees from the high unemployment RAs of the district?

It is possible that SODA's GCs are too small to generate the desired spread effects. However, the reader may recall quotes from several PAPs indicating actions that growth center leaders would take to make RA residents aware of growth center job opportunities. No doubt some publicity of job openings was undertaken, but it is likely that the intentions of growth center leaders were more effective on paper than in practice. Before the growth center strategy is adjudged impotent, EDA might institute stronger measures to insure that GC leaders' good intentions are carried out.

It should also be recalled that unemployment rates have been high districtwide, albeit higher in RA counties. Therefore, poor or unemployed growth center residents would most likely be first in line for new job opportunities. One can hardly fault city fathers for taking care of their own first. Therefore, based upon the findings of this study and the preceding concluding remarks, the following recommendations are made.

Recommendations

1. Since conclusions reached with respect to one district are too restrictive to permit national inferences, studies similar to this project should be replicated in other development districts to provide a current national composite of the job-creating effects of EDA-funded projects.

2. Since the real hourly wage rate difference was greatest for workers employed by firms utilizing highly skilled employees, SODA industrial search teams should concentrate their location efforts on industries known to pay wages above the prevailing area hourly wage rate. Technical assistance (TA) grants should be made readily available to finance training for special skills needed by such prospects, since these skills are likely in short supply in most economically depressed regions. When the location of such a firm is to be a growth center, it should be stipulated that part of the TA grant funds be spent in the district RA to advertise the availability of the job opportunities and training. The TA grant should be large enough to pay not only for setting up the program, but also to pay stipends to poor or unemployed students. An additional travel allowance should be made available to poor or unemployed students who are bona fide RA residents. Provisions for monitoring the use of TA training funds should be included in a form such that the administrators of the funds must provide evidence that their contractual obligations have been met before payment of the next increment to the grant is made. The EDA-sponsored University Business Assistance Center is an existing agency that could oversee such assistance at the local level, and the training could be carried out through existing area universities and vocational schools.

3. Follow-up on PAPs should be reinstated. Before new EDA grants for public works projects or business loans are made to a growth center community, an update to the previous PAP should be required. The update should show how growth center leaders have carried out the responsibilities to RA residents they included in the previous PAP. Funds should be allocated to enable organization of a counselling team whose

duty would be to verify that actions claimed in the PAPs to have been taken, have in fact been taken.

4. Development efforts have again become fragmented. Ever smaller SODA communities are receiving portions of EDA's limited public works and business loan funds. Although procedures for designating new and reviewing the designation of old growth centers should be instituted, every community cannot be a growth center. The growth center strategy needs to be reaffirmed. However, district planning staffs should not be limited to helping only district growth centers--the preference given to growth centers for EDA business loan and public works funds should be sufficient. Programs offered by other federal agencies are not limited to growth centers, and can be sought by district planners for noncenter communities.

5. The above recommendations basically call for a return to the fundamentals and growth center strategy originally called for by PWEDA. The suggestions are designed to strengthen growth center efforts at helping RA residents. The suggested changes are marginal in nature, not revolutionary. They likely can be instituted by executive order rather than new legislation.

SELECTED BIBLIOGRAPHY

1. Allen, K. "Growth Centers and Growth Center Policy." Regional Policy in the European Free Trade Association: An Examination of the Growth Center Idea. University of Glasgow: Social and Economic Studies, Occasional Paper Number ten. Edinburgh: Oliver and Boyd, 1968.
2. Alonso, William and Elliott Medrick. "Spontaneous Growth Centers in Twentieth-Century American Urbanization." Growth Centers in Regional Economic Development, ed. by Niles M. Hansen. New York: The Free Press, 1972.
3. Ardmore Development Authority. "Ardmore Industrial Airpark Directory." Unpublished Brochure, April, 1976.
4. Ardmore Development Authority. "Ardmore Industrial Directory." Unpublished Report, January, 1977.
5. Ardmore Development Authority. "Geographic Breakdown by Community of Commuting Labor Force of 5 Firms at the Ardmore Industrial Airpark." Unpublished Summary Sheet, July, 1973.
6. Ardmore Development Authority. "Geographic Breakdown by Community of Commuting Labor Force of 7 Firms at the Ardmore Industrial Airpark." Unpublished Summary Sheet, April, 1976.
7. Ardmore Development Authority. "Industrial Directory." Unpublished Report, September, 1973.
8. Ardmore Development Authority. "Memo to Ardmore Manufacturers, Processors & Distributors." Unpublished Memorandum, April, 1976.
9. Ashby, L. D. Growth Patterns in Employment by County, 1940-1960 and 1950-1960. U.S. Department of Commerce, Office of Business Economics, Washington, D.C., 1965.
10. Ashby, Lowell D. and David W. Cartwright. Regional Employment by Industry, 1940-1970. U.S. Department of Commerce, Bureau of Economic Analysis, Washington, D.C., 1975.
11. Boudeville, Jacque R. Les espaces économiques. Paris: Presses Universitaires de France, 1961.

12. Boudeville, Jacque R. Problems of Regional Economic Planning.
Edinburgh: Edinburgh University Press, 1966.
13. Bowles, Gladys K. and James D. Tarver. Net Migration of the Population, 1950-60, By Age, Sex, and Color. U.S. Department of Agriculture, Economic Research Service, Oklahoma State University Research Foundation, and U.S. Department of Commerce, Area Development Administration, cooperating, 1965.
14. Bowles, Gladys K., Calvin L. Beale, and Everett S. Lee. Net Migration of the Population, 1960-70, By Age, Sex, and Color. U.S. Department of Agriculture, Economic Research Service, University of Georgia, and National Science Foundation, cooperating, 1975.
15. Cameron, Gordon C. Regional Economic Development: The Federal Role. Baltimore: Resources for the Future, Inc., 1970.
16. Chinitz, Benjamin. "Types of Distressed Areas in the United States." Backward Areas in Advanced Countries, ed. by E. A. G. Robinson. London: Macmillan and Company, Ltd., 1969.
17. Clark, Colin. "The Distribution of Labor Between Industries and Between Locations." Land Economics (May, 1950), pp. 136-144.
18. Collier, George A., Jr. "On the Size and Spacing of Growth Centers: Comment." Growth and Change, Vol. 4 (October, 1973), pp. 47-48.
19. Darwent, David F. "Growth Poles and Growth Centers in Regional Planning: A Review." Environment and Planning, Vol. 1 (1969), pp. 5-31.
20. Deavers, Kenneth L. "Ada Positive Action Program, Southern Oklahoma Economic Development District, Oklahoma." Unpublished Memorandum, December, 1971.
21. Design for a Worldwide Study of Regional Development. Resources for the Future, Inc., Baltimore: The Johns Hopkins Press, 1966.
22. Dikeman, Neil J., Jr. "Business Highlights." The Oklahoma Business Bulletin, Vol. 44 (July, 1966), pp. 1-3.
23. Doeksen, Gerald A. and Dean F. Schreiner. Interindustry Models for Rural Development Research. Oklahoma Agricultural Experiment Station, Bulletin T-139, Stillwater, Oklahoma, Oklahoma State University, September, 1974.
24. Hansen, Niles M. "Development Pole Theory in a Regional Context." Kyklos, Vol. 20 (1967), pp. 709-726.

25. Hansen, Niles M. "Growth Center Policy in the United States." Growth Centers in Regional Economic Development, ed. by Niles Hansen. New York: The Free Press, 1972.
26. Hansen, Niles M. Intermediate-Size Cities as Growth Centers: Applications for Kentucky, the Piedmont Crescent, the Ozarks, and Texas. New York: Praeger Publishers, 1971.
27. Hansen, Niles M., ed. Public Policy and Regional Economic Development: The Experience of Nine Western Countries. Cambridge, Mass.: Ballinger Publishing Co., 1974.
28. Hansen, Niles M. "The Structure and Determinants of Local Public Investment Expenditures." Review of Economics and Statistics, Vol. 47, No. 2 (May, 1965), pp. 150-162.
29. Hermansen, Tormod. "Development Poles and Related Theories: A Synoptic Review." Growth Centers in Regional Economic Development, ed. by Niles Hansen. New York: The Free Press, 1972.
30. Kampe, Ronald E. and William A. Lindamood. Underemployment Estimates by County, United States 1960. U.S.D.A. Economic Research Service, Agricultural Economic Report 166, Washington, D.C., 1969.
31. Kmenta, Jan. Elements of Econometrics. New York: The Macmillan Company, 1971.
32. Kuehn, John A., Lloyd D. Bender, Bernal L. Green, and Herbert Hoover. Impact of Job Development on Poverty in Four Developing Areas, 1965-1970. U.S.D.A. Economic Research Service, Agricultural Economic Report 225, Washington, D.C., June, 1972.
33. Lage, Gerald M., Ronald L. Moomaw, and Larkin Warner. A Profile of Oklahoma Economic Development 1950-1975. Frontiers of Science Foundation, Oklahoma City, 1977.
34. Lausen, J. R. "On Growth Poles." Urban Studies, Vol. 6 (June, 1969), pp. 137-161.
35. Levitan, Sar A. Federal Aid to Depressed Areas. Baltimore: Johns Hopkins Press, 1964.
36. Mann, Noel A. Typewriter Letter dated April 28, 1977.
37. McGoodwin, James Ballard. A Study of the Anticipated Economic Changes in Carter County Resulting From the Installation of the Uniroyal Facility at Ardmore. Unpublished report presented to the M. J. Neely School of Business, Texas Christian University, December, 1968.
38. Miller, Edward. "Is Out-Migration Affected by Economic Conditions." The Southern Economic Journal, Vol. XXXIX, No. 3 (January, 1973), pp. 396-405.

39. Miller, Edward. "Return and Nonreturn In-Migration." Growth and Change, Vol. 4, No. 1 (January, 1973), pp. 3-9.
40. Milkman, Raymond H., Christopher Bladen, Beverly Byford, and Howard L. Walton. Alleviating Economic Distress: Evaluating a Federal Effort, Lexington Books (D.C. Heath and Company), Lexington, Massachusetts, 1972.
41. Morris, Douglas Edmund. "Economics of City Size: Per Capita Costs of Providing Community Services." Unpublished Ph.D. Dissertation, Agricultural Economics, Oklahoma State University, May, 1973.
42. National Bureau of Economic Research, Inc. An Analysis of Federal Economic Development Programs. Report prepared for the Economic Development Administration (EDA-OER-77-001). New York, 1976.
43. Office of Management and Budget. Standard Industrial Classification (SIC), 1967.
44. Oklahoma Employment Security Commission, Research and Planning Division. Letter from Roger A. Jacks, dated February 10, 1976.
45. Oklahoma Employment Security Commission, Research and Planning Division. "Oklahoma Population Estimates 1960-1970 Intercensal Estimates." Unpublished Bulletin dated June, 1975.
46. Oklahoma Industrial Development Department. Oklahoma Directory of Manufacturers. Oklahoma City, Oklahoma, 1976.
47. Oklahoma Water Resources Board. Oklahoma's Water Atlas, 1976. O.W.R.B., Oklahoma City, 1976.
48. Olsen, Duane A. and John A. Kuehn. Migrant Responses to Industrialization in Four Rural Areas, 1965-1970. U.S.D.A. Economic Research Service, Agricultural Economic Report 270, Washington, D.C., September, 1974.
49. Organization for Economic Cooperation and Development. Regional Economic Development in the United States, Part IV: Overview of Regional Planning and Development Policy. Washington: U.S. Dept. of Commerce, Economic Development Admin, undated.
50. Orshansky, Mollie. "Counting the Poor: Another Look at the Poverty Profile." Social Security Bulletin. U.S. Department of Health, Education, and Welfare, Social Security Administration, Washington, D.C., January, 1965.
51. Ostle, Bernard. Statistics in Research. Ames: The Owa State University Press, 1963.

52. Paelinck, Jean. "La theorie du developpement regional polarise." Cahiers de l'ISEA., Vol. 15 (March, 1965), pp. 10-11.
53. Perloff, Harvey S., Edgar S. Dunn, Eric E. Lampard, and Richard F. Muth. Regions, Resources, and Economic Growth. Baltimore: The Johns Hopkins Press, 1960.
54. Perroux, Francois. "Economic Space: Theory and Applications." Quarterly Journal of Economics, Vol. 44 (February, 1950), pp. 90-97.
55. Perroux, Francois. "Note sur la notion de pôle de croissance," Economie Appliquée #1-2, 1955.
56. Pontotoc County Industrial Authority. "Notes to Financial Statement." Unpublished Report, December, 1975.
57. Regional Policy in EFTA: An Examination of the Growth Center Idea, University of Glasgow: Social and Economic Studies Occasional Paper Number Ten, Edinburgh: Oliver and Boyd, 1968.
58. Richardson, Harry W. "Optimality in City Size, Systems of Cities, and Urban Policy: A Skeptic's View." Urban Studies, Vol. 9, February, 1972, pp. 29-48.
59. Richardson, Harry W. Regional Economics. New York: Praeger Publishers, 1969.
50. Samuelson, Paul A. Economics. New York: The McGraw-Hill Book Company, 1973.
61. Schreiner, Dean F. and James C. Chang. Projection and Analyses of the Economies of Substate Planning Districts in Oklahoma. Stillwater: The Ozarks Regional Commission, September, 1974.
62. Schreiner, Dean, Arthur Ekholm, and James Chang. A Guide to Input-Output Analysis for the Oklahoma Economy. Oklahoma City: The Oklahoma Department of Economic and Community Affairs, Oklahoma City, Oklahoma, May, 1977.
63. Schumpeter, Joseph A. Business Cycles (Vol. 1). New York: The McGraw-Hill Book Company, 1939.
64. Southern Oklahoma Development Association. "EDA Positive Action Program -- Progress Report, Ada, Oklahoma, Growth Center." Unpublished Letter, October, 1972.
65. Southern Oklahoma Development Association. "EDA Positive Action Program -- Renewal and Progress Report, Ada, Oklahoma, Growth Center." Unpublished SODA Report, January, 1971.
66. Southern Oklahoma Development Association. "The Overall Economic Development Program for the SODA Economic Development District." Unpublished Report, August, 1976.

67. Southern Oklahoma Development Association. "Positive Action Program: Durant Municipal Water Service Extension." Unpublished Report, June, 1968.
68. Southern Oklahoma Development Association. "Positive Action Program for the Economic Redevelopment Center of Durant, Oklahoma." Unpublished Report, September, 1970.
69. Southern Oklahoma Development Association. "Positive Action Program, SODA District Growth Centers: Ada, Ardmore, Durant." SODA, January, 1969.
70. Southern Oklahoma Development Association. "Project Application - Ada Downtown." Unpublished Application, April, 1967.
71. Summers, Gene F., Sharon Evans, Frank Clemente, Elwood Beck, and Jon Minkoff. Industrial Invasion of Nonmetropolitan America: A Quarter Century of Experience. U.S. Department of Commerce, Economic Development Administration, National Technical Information Service Report PB-254-183, September, 1975.
72. Sundquist, James L. and David W. Davis. Making Federalism Work. Washington: The Brookings Institution, 1969.
73. S.V.I.M.E.Z., "Ricerca sui coste d'insediamento," 1967.
74. Swanner, Joseph B. "Management of EDA's Public Works and Business Development Programs: Inventory of Completed Projects." Unpublished Memorandum, April, 1973.
75. Thomas, Morgan D. "Growth Pole Theory: An Examination of Some of Its Basic Concepts." Growth Centers in Regional Economic Development, ed. by Niles M. Hansen. New York: The Free Press, 1972.
76. Tolosa, Hamilton. "Growth Poles: A Study in the Economics of Spatial Concentration." Unpublished Ph.D. Dissertation, The Regional Science Department, The University of Pennsylvania, 1969.
77. Tweeten, Luther. "Emerging Issues for Sparsely Populated Areas and Regions Under a National Growth Policy." American Journal of Agricultural Economics, Vol. 55, No. 5, December, 1973, pp. 840-850.
78. U.S. Congress. House. The Public Works and Economic Development Act of 1965. Pub. L. 89-136, 89th Cong., 1st Sess., 1965.
79. U.S. Congress. Joint Session. "Text of President Nixon's State of the Union Message." Congressional Quarterly, XXVII (4), p. 245.

80. U.S. Department of Commerce, Economic Development Administration. Detailed Case Studies: Supporting Documentation for the EDA Growth Center Evaluation. U.S.D.C., February, 1972.
81. U.S. Department of Commerce, Economic Development Administration. Form ED-612, "Applicant or Beneficiary Firm's Estimate of the New Job Opportunities Created by This Project." Form revision dated May, 1972.
82. U.S. Department of Commerce, Bureau of Economic Analysis. "The Input-Output Structure of the U.S. Economy: 1967." Survey of Current Business, Vol. 54, No. 2 (February, 1974), pp. 24-56.
83. U.S. Department of Commerce, Economic Development Administration. Program Evaluation: The Economic Development Administration Growth Center Strategy, U.S.D.C., February, 1972.
84. U.S. Department of Labor, Bureau of Labor Statistics. BLS Handbook of Methods for Surveys and Studies (Bulletin 1910). U.S. Government Printing Office, Washington, D.C., 1976.
85. U.S. Department of Labor, Manpower Administration. Dictionary of Occupational Titles (1965), Volumes I and II, Washington, D.C., third edition, 1965.
86. Warner, Larkin. New Manufacturing Plants in Nonmetropolitan Oklahoma, 1967-1973. Prepared for the Ozarks Regional Commission by the Oklahoma State University Research Foundation, Stillwater, Oklahoma, 1975.
97. Webster's New World Dictionary. Nashville: The Southwestern Co., 1968.
88. Yan, Chiou-shuang. Introduction to Input-Output Economics. New York: Holt, Rinehart and Winston, 1969.

APPENDIX A

EMPLOYEE QUESTIONNAIRE AND
RELATED DOCUMENTS

EMPLOYEE QUESTIONNAIRE
COVER SHEET

To the respondent:

You are an important element in the economy of the SODA region. For almost a decade, this region has been under expanded efforts to enhance economic growth and development. The aim has been to increase job opportunities, increase incomes, and improve the quality of life of region residents. This study, of which you are an important part, seeks measures of how concentrated investment into three growth centers (Ardmore, Ada, Durant) has worked toward achieving the goals of the growth center strategy.

Although your name is recorded on this cover sheet, it will be separated from the survey during processing, and in the final summary, no information will be traceable to you. If you like, a synopsis of the results will be mailed to you at the address you provide. Thank you for helping us help you to a better life!

Interviewer: Please introduce yourself, if you have not already done so.

1. Interviewer: _____ Interview date _____
2. Respondent's name _____
3. Does respondent (R) want study synopsis? Yes No
4. If yes, please obtain suitable mailing address
 Street _____
 City, State, Zip _____
 Telephone number _____
5. Sample Information:
 Identification # _____ Return Sequential # _____
 Job type _____
 Sex indicated Male Female
6. Reason for non-interview
 absent on interview day
 partial refusal
 administratively inaccessible

Interviewer comments _____

4/13/76

Go to Questionnaire

EMPLOYEE QUESTIONNAIRE

I. Background Information

1. Where do you live _____
(Community, or if rural, relative to nearest town)
2. Are you living now in the same community that you were when you started your present job? Yes go to question ③ No go to question ②a.
 - a. Where were you living before _____
(City, state, if rural, relative to nearest town)
 - b. Was the main reason for the move associated with your present job? Yes No
3. How do you get to work?
 - a. Please select the transportation mode you use from the list. RC#3
 - b. How long does it take to get to work? _____ hours
 - c. Other _____
 - d. If car pool indicated, #in pool _____

II. Household Income (Present Job)

4. What is the name of the firm you work for? _____
5. How long have you been with this firm? _____ (Years or date)
6. Work location _____ (Community name)
7. What kind of work do you do in your present job?
 - a. Job title/employee title _____
 - b. Describe the work you do _____
 - c. Hourly regular-time wage rate _____
 - d. If otherwise paid, indicate amount above and frequency here _____ (wk,mo,yr)
 - e. Are you employed full-time (35 hours/week or more) or part-time (less than 35 hours/week) ?
 - f. About how much are you earning (before deductions) from this job? \$ _____ (wk,mo,yr)
8. Do you have a second job? No go to #9, Yes go to ⑧a.
 - a. Describe what you do _____
 - b. How much time do you spend per week? _____ (hrs)
 - c. About how much do you receive from your second job? \$ _____ (circle: wk,mo,yr)
9. Is any other household member earning income?
 - a. no go to ⑩
 - b. yes about how much (before deductions) is being earned by all others, combined?
\$ _____ (circle: wk,mo,yr)
10. Is any income received by your household from public assistance programs (AFDC, Aid to Disabled, Food Stamp Value, unemployment compensation)?
 - a. No go to ⑪
 - b. Yes about how much is being received, all told, from assistance sources? \$ _____
(wk,mo,yr)
11. Does your household receive any other income (such as from social security, interest, dividends, rent, alimony, child support, relatives)?
 - a. no go to ⑫
 - b. yes about how much is being received, all told, from other sources? \$ _____
(circle: wk,mo,yr)

4/13/76

III. Household Income (Immediately Preceding Job)

12. Before taking your present job were you
 not working? (go to 13)
 unemployed? (go to 14)
 employed? (go to 14)
13. If you were not working, and not looking for a job, what were you doing?
 RC#13 Other _____
14. If the present job had not become available, what were your plans (check one most appropriate)
 _____ Look for other work in the same town (wherever living in Q12)
 Move to _____ and look for work
 _____ Look for work in another town, but maintain the existing residence and commute
 _____ Other (comment) _____

(Skip to 18 unless R was employed, in which event go to 15)

15. What kind of work did you do in the immediately preceding job?
 a. Job title/employee title _____
 b. Describe the work done _____
 c. Hourly regular-time wage rate _____ as of what date? _____
 d. If otherwise paid, indicate amount above and frequency here _____ (wk,mo,yr)
 e. Were you employed full-time (35 hours/week or more) or part-time (less than 35 hours/week) ?
 f. Where were you employed? _____
 (Firm, city, state, dates--from & to)
 g. About how much were you earning (before deductions)? \$ _____ (wk,mo,yr)
 h. What do you think you'd be earning now if you still held this job? \$ _____ ()
 (comments applicable to above) _____
16. Since you were already employed full or part-time, why did you take the present job?

17. Did you have a second job? no go to 18, Yes go to 17a
 a. Describe what you did _____
 b. How much time did you spend per week? _____ (hours)
 c. About how much did you receive from your second job? \$ _____ (circle: wk,mo,yr)
18. Was any other household member earning income?
 a. no go to 19
 b. yes about how much (before deductions) was being earned by all others combined?
 \$ _____ (wk,mo,yr) circle.
19. Was your household receiving any income from public assistance programs (AFDC, Aid to Disabled, Food Stamp Value, unemployment compensation)?
 a. no go to 20
 b. Yes about how much was being received, all told, from assistance sources?
 \$ _____ (wk,mo,yr).
20. Did your household receive any other income (such as from social security, interest, dividends, rent, alimony, child support, relatives)?
 a. no go to 21
 b. yes about how much was being received, all told, from other sources? \$ _____ (wk,mo,yr)

4/13/76

IV. Information About Household Status

21. Sex of employee being interviewed: M F
22. Race of employee being interviewed:
 Spanish Surname American Indian
 White Oriental
 Negro Other _____
23. Age of employee being interviewed _____ years to nearest birthday.
24. What is your marital status? RC#24
25. How are you related to the head of the household? RC#25
26. How many dependents:
 a. other than the head, are in your household? # _____
 b. are under 18 years of age? # _____
 c. are 18 years or older, still living at home and are not elderly or incapacitated? # _____
 d. are elderly, or permanently incapacitated? # _____
 e. are unaccounted for in b, c, or d # _____, describe each _____
-
27. Please tell us about the grown children of the head or wife of the household head
 a. How many are there all told? # _____
 b. Where do they live and what is their occupation?

	Sex	Age	Residence - city, state	Work location	Occupation
a.					
b.					
c.					
d.					

28. How many grades of school did you finish? _____ grades
29. Did you graduate from high school? Yes No GED
30. Have you college education?
 a. No go to 31 (enter # of years if no degree attained)
 b. Yes what degree (s) do you have? _____
31. What kind of training have you had for your present job?
 _____ on-the-job; length of training _____ months
 _____ vocational course; length of training _____ months
 _____ union apprenticeship; length of apprenticeship _____ months
 _____ other, please describe _____
32. Has this training ^{# of months attributable to other} resulted in higher pay and/or a more responsible position with this firm?
 _____ No _____ Yes, comment _____

4/13/76

V. Information About Household Spending Impact

33. The last item we want you to help us estimate is the economic impact of spending your income. Using earlier questions, I compute your total monthly household income to be \$ _____ before taxes. Does this seem about right? Yes, go to 33a. No: Ask R what it should be, then go back to components computed earlier and correct to reconcile with total.

- a. About what proportion of this before-tax monthly income is deducted or used to make regular payments for:
- | | Where Made | % |
|--|------------|-------|
| 1. taxes (include all income taxes, social security, both Federal and State) | 1. | _____ |
| 2. home and land payments | 2. | _____ |
| 3. car, truck payments | 3. | _____ |
| 4. total insurance payments (medical, life, auto, but include home insurance with home payments) | 4. | _____ |
| 5. other payments (specify) _____ | 5. | _____ |
| 6. other payments (specify) _____ | 6. | _____ |
| 7. saving (payroll deduction plans) | 7. | _____ |
| 8. saving, elsewhere | 8. | _____ |
- b. About what proportion (not indicated above) is spent:
- | | | |
|--|-----|-------|
| 1. in your resident community? | 1. | _____ |
| 2. within a growth center (enter same % if center is same as resident community) | | |
| a. Ardmore | 2a. | _____ |
| b. Ada | 2b. | _____ |
| c. Durant | 2c. | _____ |
| 3. Within Coal, Johnston, and/or Atoka RA counties | 3. | _____ |
| 4. In none of the above, but within another SODA cty | 4. | _____ |
| 5. Elsewhere (please specify place) | | |
| a. Place 1 _____ | 5a. | _____ |
| b. Place 2 _____ | 5b. | _____ |

Thank you for taking your valuable time to help! We will be careful to keep this information confidential in our analysis.

5/4/76

RESPONDENT CARD

- (3) What transportation mode do you usually use to get to work?
1. Driver, private auto
 2. Passenger, private auto
 3. Car pool
 4. Bus
 5. Railroad
 6. Taxicab
 7. Walk
 8. Other means-specify, please
- (13) If you were not working, and not looking for a job, what were you mainly doing?
1. being a housewife
 2. being a student
 3. too discouraged because of the lack of local job opportunity to actively seek work
 4. waiting for the firm I work for to begin hiring
 5. temporarily disabled
 6. retired
 7. other-specify, please
- (24) What is your marital status?
1. Now married
 2. Widowed
 3. Divorced
 4. Separated
 5. Never married
- (25) How are you related to the head of your household?
1. Head of household
 2. Wife of head
 3. Son or daughter of head
 4. Other relative - describe exact relationship
 5. Roomer, boarder, lodger
 6. Patient or inmate
 7. Other, not related - describe, please

EMPLOYEE QUESTIONNAIRE
INTERVIEW INSTRUCTIONS

1. Cover Sheet: The respondent (R) should have a copy of the questionnaire before him. R thus follows along with interviewer, as interviewer completes the actual questionnaire. Explain to R that cover sheet is removed for processing, and that identity of individual will be lost in final summary. Only item of interest is whether R would like study synopsis, in which case a suitable mailing address is needed. No trouble has been experienced obtaining a telephone number - simply act as if it is a continuation of the mailing address. If questioned, simply say that you might foul up a question and that the supervisor could then contact R for clarification. The balance of cover sheet information is administrative. Do not mention item six, and use only in case of difficulty. Comments space may be used to expound on answer to #6, or may reference specific items inside survey. Be sure to designate question number referenced; i.e., "six, above, ---;" "six, inside ---".
2. Questionnaire 1: An Oklahoma road map should be available, with the SODA Region sketched thereon; R can point to geographic residence on map, if rural. Town of nearest proximity can then be observed (and error avoided). One R noted her residence as near Bennington. When map was referenced, residence was obviously nearest Bokchito. Closer questioning revealed that she lived on the Bennington rural mail route, but that her home was in fact outside Bokchito. The information desired is not mail route, but to enable computation of commuting distance.
3. Questionnaire 2: No specific comments.
4. Questionnaire 3: Duplicate copies of R card facilitate answering R card questions. Thus R and interviewer can both look at R card rightside-up.
5. Questionnaire 4: Interviewer may already have firm name written in, to save time.
6. Questionnaire 5: Time with firm is called for in years. Be sure to note any other time dimension specifically; viz., "6 days".
7. Questionnaire 6: May be completed in advance.
8. Questionnaire 7: Present Job
 - a. job title is title assigned to job by employer.
 - b. work description is employee's own description of what he does at work.
 - c. regular-time wage rate is hourly rate, not overtime wage rate, providing employee is normally paid by the hour.
 - d. otherwise paid-suppose employee is paid weekly, then write or circle "wk".
 - e. check full-time or part-time as appropriate.

f. amount here is job earnings. Amount in c and f may differ. For example, if employee is working a 48-hour week and regularly draws \$2.55 an hour, \$2.55 will be entered in c. If the assumption were made that the employee worked a 40-hour week, then the implied gross income would be $40 \times \$2.55 = \102 . Actually, gross income is $40 \times \$2.55 + 8 \times \$3.82 = \$132.56$ per week. The difference arises because overtime rates are usually $1\frac{1}{2}$ the regular rate. Entry f is the first of five income components which will be summed to determine present, before deduction, household income.

Hint: Some R may be reluctant to give income or earning information. Although no R failed to cooperate on the pre-test, this question is a likely point for trouble to develop. Should your R be reluctant, a next best alternative is to ask for letters from the Earnings/Income Key representative of the component being requested. Enter code letters in blanks. Editors will convert to numeric values later.

9. Questionnaire 8: a, b - self-explanatory. c - be sure to indicate time period over which second job income is received.
10. Questionnaire 9: This other income, in some cases, may be substantial. Suppose your R is the wife, son, or daughter of the household head. Then the other income would likely be the annual gross earnings of the head of the household. Again be careful to circle the time period over which the income is earned.
11. Questionnaire 10: Public assistance program income may be thought of as income received from welfare programs. Disability payments received from the V.A. or other sources would be entered here, but V.A. benefits are transfer payments that better fit in the next income component.
12. Questionnaire 11: Any other income - this means income not counted in the previous four components. Be careful to note time period over which income is received, and circle or write in source.
13. Questionnaire 12: Not Working means R falls into categories on RC #13. Unemployed is defined as defined by the Bureau of Labor Statistics: The R was a civilian, had no employment, but was available for work and (1) during the four weeks prior to taking the present job, engaged in any specific job-seeking activity; (2) was waiting to be called back to a job from which he had been laid off; or (3) was waiting to report to a new job within 30 days.
14. Questionnaire 13: Show R possibilities for RC#13. Usually R will not select a specific one, but will detail in full what he was doing. Interviewer can then interpret and suggest best fitting category. If no category fits, mark 7 in the circle and jot down description in "other" blank.
15. Questionnaire 14: Only one answer should be indicated - the best

fitting one. If no specific answer fits, check "other" and describe in detail in comment space.

16. Observe: The Skip instruction, which works in conjunction with question 12.
17. Questionnaire 15: is essentially the same as question 7, but refers to job held immediately before the one presently held. If R was not working or unemployed, question 12 will filter interview past questions 15, 16, and 17. Thus not working or unemployed answers to question 12 imply R had no second job in previous period. If he did have a second job, then R was, in fact, employed and question 12 should be so marked, and questions 15, 16, 17 answered, as appropriate. Observe that 15f and 15h differ from question 7. Note that space in parenthesis on 15h is left so that time period can be entered. Write in "wk", "mo", or "yr" as appropriate.
18. Questionnaire 16: self-explanatory.
19. Questionnaire 17: parallels question 8, for preceding job.
20. Questionnaire 18: parallels question 9, for preceding job.
21. Questionnaire 19: parallels question 10, for preceding job.
22. Questionnaire 20: parallels question 11, for preceding job.
23. Questionnaire 21: check as appropriate from observation.
24. Questionnaire 22: check as appropriate from observation, but ask R, if in doubt.
25. Questionnaire 23: With women, don't beat around the bush - ask casually and age will be forthcoming.
26. Questionnaire 24: Marital status - show R card, and enter appropriate number on R card in number 24 circle.
27. Questionnaire 25: Again show R card, and enter appropriate number in RC#25 circle. Familiarity with R may permit interviewer to enter relationship to head without asking specifically.
28. Questionnaire 26: Consider several specific examples. Assume that the household consists of six persons:
 - the husband and head
 - the wife of the head
 - one 13-year-old daughter of the wife and head
 - one 21-year-old son of the head, by a previous marriage, not living at home, but still a dependent
 - one 18-year-old daughter, still living at home
 - one dependent grandparent residing with this household

Now suppose you are interviewing the wife of the head. Answers to

question 26 would be a. 5, b. 1, c. 2, d. 1, e. 1. Since both the wife and 18-year-old daughter are 18 or over, at home, and dependents, c is 2. Note that $b + c + d + e = a$.

As another example, suppose you are interviewing an 18-year-old still living at home in a household consisting of a female divorcee, her aged father, two minor children, and the 18-year-old son. Here, the female divorcee is the head. The answers to #26 become: a. 4, b. 2, c. 1, d. 1, e. 0. Note again that $b + c + d + e = a$.

As a third example, suppose you are interviewing a male divorcee with three minor dependents (if he supports them; they are still his, even if living with their mother), one 19-year-old daughter, still living at home, and one 25-year-old grown son, living elsewhere and no longer a dependent. The answers to question #26 become, a. 4, b. 3, c. 1, d. 0, e. 0. Note that again $b + c + d + e = a$.

29. Questionnaire 27: The number of grown children may or may not match figures from 26. Grown children are defined as those 18-years old or older. They may or may not be living at home. Suppose you are interviewing the male divorcee in example three, above. He has two grown children, one living at home, the other not. #27b entries would be:

Sex	Age	Residence - city, state	Work location	Occupation
a. F	19	at home		Student
b. M	25	Okla. City, OK	Okla. City	Bank teller

30. Questionnaire 28: enter highest grade finished up to 12.
31. Questionnaire 29: A person could finish twelve grades, and not graduate from high school. A person could finish only nine grades, and still graduate from high school, by passing GED exams. Thus, if a person claims he did not graduate from high school, probe by asking, "not even GED?"
32. Questionnaire 30: enter B.S., B.A., Ph.D., etc., as applicable. If R indicates that he attended college, but received no degree, make entry to that effect. For example, a person attending junior college for two years, but not graduating, might be written up as, "Jr. College, 2 yr., no degree".
33. Questionnaire 31: More than one type of training may be indicated. On-the-job training is probably the most common, and if so indicated, probe as to length of a formal OJT period. If the R claims, for example, 3 months, probe as to whether this is his own estimate, or represents an official period of time. Any response of a period of time that is unofficial should be designated as "no formal period". Only if the employer designates a formal period, should a time period be so indicated. Similarly, vocational training means a formal training program, whether the employee received the training at an area vocational school or with a formal program inplant.

If any doubt exists about the classification of the training, check "other," and describe. A R who is a professional, such as an accountant with a B.A. degree in accounting, might indicate his college training as the training for his work. In this case, check "other" and indicate "B.A. degree in accounting."

34. Questionnaire 32: check yes or no as appropriate. Probe for comments, regardless of answer. Since either answer is an indication of R's opinion, any indication of his reasoning is of interest.
35. Questionnaire 33: The last question is lengthy. Several R in the pre-test appeared restless even by the end of section IV. Therefore, some encouraging comments toward the end of Section IV may improve response on the final page. For example after question 32, the interviewer might comment, "We're almost through! Now the final question tries to find out where you spend all the income you indicate you receive." Incidentally, the interviewer should have a small calculator available for computing percentages.

Begin by calculating the R's monthly income. To do so, convert answers to questions 7f, 8c, 9b, 10b, and 11b to monthly amounts. Use the scratch space on the lower half of the last page for figuring. Then, add together the monthly components to obtain total monthly income. Next, suggest the amount aloud, to the R, as the proposed monthly gross household income. If R does not indicate value is correct, the opportunity is presented for adjusting the income components in the previous questions so that the component total matches what the R thinks his monthly gross income is.

After the monthly gross income of the household is established, make a comment to the R, in effect, "that we first want to deduct withholding and other sorts of regular payments over which the R has little control, and which have little responding impact on the area." Estimate first the monthly payroll withholding amounts (usually these are income taxes and social security). Frequently, the R will produce a paycheck stub, which greatly helps make an accurate estimate. Do not include as taxes such payroll amounts as are being withheld for bonds (a form of saving) or for health or life insurance policies. These amounts should be considered in their appropriate category. However, if mention of them is made, jot down the monthly amount in the scratch space, and recall it later at the appropriate point. After an amount is computed for taxes, compute its percentage of the monthly gross income, and write the percentage in the space opposite taxes.

Similarly, compute the percentage of gross monthly income going for home payments and car payments. Usually the home payment amount will include home owner's insurance and property taxes on the home.

During the pre-test some R became curious about what was being attempted. No harm is done by telling them that you are trying to arrive at the proportion of gross income left each month which the household can choose to spend. All figures will later be totalled by geographic area so that the proportion of income spent within SODA may be determined.

Insurance payment usually consist of automobile insurance, hospitalization, and life insurance. Ask specifically about home owner's insurance. If it is listed with home payments, fine. If not, add to the home payment figure, so that all home owner's insurance is considered as part of home payments.

Other payments refer to such regular monthly payments as land payments, or other regular non-local payments for items other than consumer goods.

R frequently neglect to mention saving. They tend to even respond to direct probing that the family saves nothing out of its monthly income. Nevertheless, saving should be specifically inquired about.

Total the percentages entered in question 33a. Subtract this total from 100%. The remainder is the proportion of monthly gross income whose spending is discretionary (more so than amounts considered in 33a).

Allocate the remaining gross income to the geographic areas mentioned in 33b. The objective is to account for 100% of household gross income between 33a and 33b. Sometimes results are hastened by eliminating unlikely possibilities. If the R resides in Durant, for example, refer to the Oklahoma road map and point to the RA counties (Coal, Johnston, and Atoka counties). Odds are that little or nothing is regularly spent there unless the R resides there. Inquire next about the other two growth centers: Ardmore and Ada. Third, inquire about other SODA counties. Only the resident community (in this case Durant) and elsewhere categories remain as candidates for the unallocated remainder of gross income.

Experience with the pre-test, run in Durant, indicated that the allocation process was almost a game. Considerable rapport with R usually had developed. The final allocations usually were between Durant (if Durant was the resident community) and an elsewhere category, frequently Sherman-Denison. No effort was made to separate spending in Sherman from Denison, since both communities are relatively close together, from the viewpoint of a Durant resident. Similarly, Dallas-Ft. Worth would be treated as one area, Oklahoma City might be thought of, when in fact, Moore, Oklahoma, is the area of spending, and finally Tulsa might be listed by the R, when in fact spending occurs in Sapulpa. Only the approximate geographic location of "elsewhere" is desired. It is more important to obtain accurate estimates of the percentages. It is possible for R to reside in a community close to a growth center, and thus three or more places of spending could be evident. For example, a person residing in Calera might spend part in Calera, part in Durant, and still list Sherman-Denison for a third share.

As a check, quickly total all percentages. Be careful not to double count the percentage being spent in resident community and a growth center, when the person resides in a growth center. The total should be 100%, and should be adjusted to 100% before R is released.

Again, thank the R, and mention the confidentiality of his response in the final study.

DEFINITIONS
Employee Questionnaire

(In order of Appearance)

Population coverage - This survey includes employees of establishments located in SODA. A qualifying establishment is one which has benefited from a SODA-catalyzed public-works or business-loan project to the extent that the public-works project or business-loan was a determining or at least critical factor in the establishment's decision to locate in the SODA area, or a critical factor in the establishment's expansion plan. Included in the category of benefitting establishments are those within SODA whose location or expansion resulted from a significant customer, supplier, or service relationship with a direct project beneficiary. Excluded are establishments or services whose location or expansion is primarily induced by increasing area economic activity, even though the increased economic activity might result primarily from qualifying establishments.

Transportation mode - refers to the chief means of travel or type of conveyance used in traveling to and from work. If more than one means is used in daily travel, report as the chief mode the one covering the greatest distance over the trip (see respondent card for choices, enter code number in space).

Firm worked for - the firm at which the employee holds his "present job".

Present job - is to be interpreted as the employees full-time job in the case of employees with full-time jobs and also part-time or moonlighting jobs. In case the employee considers himself working at two full-time jobs, the present job should be interpreted as the one in which he normally works the greatest number of hours. In case the employee has a full-time job, but is working reduced hours temporarily, the full-time job should still be considered the "present job", even if the worker is working a greater number of hours at a temporary, part-time, or moonlighting job. Other special cases, please note by question number on additional notepaper and attach description of situation to questionnaire.

Hourly regular-time wage rate - wage rate per hour being paid the employee for performing the job, for which job title and description have been given. Rate should not be average of regular rate, time and a half, and double time rates. Compensation received for working overtime will be reflected in earnings received from job, requested in a later question. If employee is paid on basis other than hourly (such

as a monthly salaried professional) indicate amount in "wage rate" space and frequency of payment (weekly, monthly, quarterly, etc.) in "other-wise paid" space. Special commission arrangements and other pay arrangements should be described on notepaper and attached to questionnaire (list question number referenced).

Full-time employment - a job normally calling for 35 hours per week or more of work, even though work hours might presently be reduced.

Part-time employment - a job for which the worker is employed less than 35 hours per week, but for which the reduced hours are not considered temporary. The job should be expected to last longer than a week, and may or may not be the employee's primary earning endeavor. Income deriving from incidental, moonlighting, irregular, "odd" jobs may be included in the "second job" category of questions eight and seventeen.

Second job - secondary jobs producing additional revenue for the worker. They should not be the same job considered above as part-time or full-time.

Unemployed - an unemployed person was one who was a civilian, had no employment, but was available for work and (1) during the four weeks prior to taking the present job, engaged in any specific jobseeking activity; (2) was waiting to be called back to a job from which he had been laid off; or (3) was waiting to report to a new job within 30 days.

Race - the parent population is considered divided into groups on the basis of race: Spanish Surname, White, Negro, American Indian (regardless of tribe), Oriental (includes Japanese, Chinese, Filipino, Hawaiian, Korean, Vietnamese, Cambodian, Indonesian, Thais) and other. The last category includes any other races except those previously specified. Since race is that stated by respondent, race is not necessarily the same as scientific biological definition. If respondent is of mixed parentage and is doubtful of racial classification, assign R race of respondent's father.

Marital status - refers to status at time of interview. "Married" persons are those presently married, including those remarried after having been widowed or divorced. Classify as "separated" persons legally separated but not divorced and persons otherwise absent from their spouse because of marital discord. Classify as "never married" singles not elsewhere classified and persons whose only marriage was annulled. Classify persons in common-law marriages or living together as if married, as married.

Household - all persons occupying a housing unit. A household includes related family members and also unrelated persons, if any, such as lodgers, foster children, wards, or employees, who share the same housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household. However, persons living in group quarters, such as residents of lodging and boarding houses, military barracks, college dormitories, fraternity and sorority houses, hospitals, and nursing homes, would not be considered a household.

Head of household - the person who is regarded as the head of the household by the members of the household is the "head of the household." When the household consists of a family (of at least a married woman living with her husband) the husband is automatically considered the head. The head of the household may also be a family head (see family below), or may be a household head and living alone or with non-relatives only.

Family - a group of two or more persons related by blood, marriage, or adoption, and residing together; all such persons are considered as members of the same family.

Dependent - a person (child or adult) receiving over half his or her support from the household head. Support includes things like food, shelter, clothes, medical and dental care, and education. Dependents may be related, adopted, or foster children; elderly parents, or even unrelated individuals, as long as they receive support as indicated.

APPENDIX B

FUNDED PROJECT EVALUATION QUESTIONNAIRE
AND RELATED DOCUMENTS

FUNDED PROJECT EVALUATION
COVER SHEET

Identification # _____

To the respondent:

Your establishment benefits either from an Economic Development Administration Public Works Project or from an Economic Development Administration Business Loan. We are attempting to quantify some of the economic impact of this investment on the SODA Economic Development District. We are also searching for other ways to enhance economic activity in the district.

Your cooperation is essential to the success of this study, because your answers supply information for subsequent sample selection. If you desire, information provided will not be linked directly to your establishment by name. However, complete disguise may prove difficult, because in many instances, only one firm of your type exists in the SODA region.

1. Interviewer _____ Interview Date _____

2. Establishment _____ Main Phone _____
Street _____
City, State, Zip _____

3. Does respondent (R) want study synopsis? yes no
If yes, send to:
Name _____
Street _____
City, State, Zip _____

4. Description of Local Establishment Products

5. Parent Company Name or (NA)

6. Details of EDA Projects establishment benefits from

Description	Completion Date	Total Cost
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____

7. Details of EDA Business Loan Received by Establishment

Funds Provided for	Date	Amount
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____

Persons interviewed (Identify person with code # throughout rest of survey)

Code #	Persons Name	Title (e.g., plant mgr., personnel, etc.)	Phone or Ex #)
1.			
2.			
3.			
4.			

I. Location Factors (R Code #)

1. When did this (local) establishment become operational?

2. Are there other establishments nearby engaged in the same type of activity?
 - a. no go to 3
 - b. yes Establishment's Name _____
 - c. Where located _____
3. Why did your establishment locate where it is?
 - a. Most important reason _____
 - b. Next most important _____
 - c. Third most important _____
 - d. Other important reason _____
4. Why was the establishment not located in another SODA community? (Interviewer: suggest names of similar-sized communities)
 - a. Alternate SODA Growth Center Suggested
 1. Community Name _____
 2. Respondent's comment _____
 - b. Alternate SODA Non-Growth Center suggested
 1. Community Name _____
 2. Respondent's Comment _____
 - c. Other Respondent Comments _____
5. Would this establishment have been built elsewhere had the EDA Public Works Project or Business Loan funds not been made available?
 - a. no Comments: _____
 - b. yes Comments: _____
6. Were any other locational inducements offered and taken advantage of?
 - a. no go to 7
 - b. yes -- suggest using framework below:

Incentive Character	Financial Loans	Plant Site (Ex. Bldg)	Buildings	Tax	Training	Utilities
Source (S.F.K.P.Sd.M)						
\$Value to firm						
Received (M,Y)						
Year ends or loan length						
Annual Payment or Rent (Lease)						
Pur Option (w/with, w/o)						
Owned? Year Title received						
Quantity (acres, trained sq. ft)		acres	sq. ft.		number	
Describe Loan's use		Site Tax Incentive	Building tax Incentive	Other Tax Incentive	Rates Paid	
				*	Gas	/kcf
					Electric	/kwh
					Water	/cf
					Sewage	/mo
					Garbage	/mo

* ex. Is a payment in lieu of taxes being made to the county, city, etc.?

7. What special Facilities were required to service this establishment?

Check If Yes	Facility	Describe Specifically	When Provided	At What Cost	How paid for?
	Water				
	Gas				
	Electric				
	Sewer				
	Garbage				
	Police				
	Fire				
	Access Roads				
	Railroad Spur				
	Telephone				
	Employee school				
	Dependent School				
	Other				

II. Employee Impact (R Code#)

8. Please categorize your establishment's employment (Categorization to be used for interview selection)

Job Type	Permanent Full Time				Part Time			
	Male		Female		Male		Female	
	#	Tot Paid	#	Tot Paid	#	Tot Paid	#	Tot Paid
Management								
Professional								
Sales								
Clerical								
Craftsmen & Technicians								
Operatives & Laborers								
Service								
Total								

9. Interviewer - total annual amounts paid employees on bottom line of above table, then offer total to R as suggested present annual establishment payroll.
 a. yes, total fairly approximates annual establishment payroll.
 b. no, annual establishment payroll is? \$ _____
 (Interviewer-adjust table 8 so that total is within 10% of 9b amount)

III. Nature of Interaction (establishment with economy) (R Code#)

10. Please allocate the inputs and outputs of your establishment geographically, using the following framework. Labor input amounts should reconcile with totals listed in question 8.

Item	Total Value (Avg. \$ Per Annum)	Percentage Distribution				Total %
		GC County	RA County	Other SODA	Outside SODA	
Sales (to)						100
Inputs from						
Mfg of Product						100
Operational Supply						100
Utilities						100
Transportation						100
Taxes Paid (Plant Only)						100
Labor (Of employees)						
Full time						100
Part time						100

11. Have any suppliers of raw materials or subassemblies tallied in question 10 moved into the SODA area or expanded their establishments as a result of your demand for their product? Please indicate below:

Firm's name	Address	Contact Person	Input Purchased	Ann. \$ worth
a.				
b.				
c.				

12. Are there any supplies or subassemblies used whose manufacturers might be induced to locate locally or within the SODA area? Is there an important user of your product who might be induced to locate locally? Does your production process produce a waste that might be converted into a profitable product? Do you think this product could be produced locally? Please indicate below:

Description of Item	I P W (check)			Annual Quantity Used or Produced & measure (gal)	Annual Dollar Value & current pri.	Name of Supplier/ Customer	Present Location	P L P
	I	P	W					

IV. Value of Existing Establishment & Expansion Plans (R Code#)

13. What is the approximate total value of this establishment at this interview date?

- a. land _____ acres available; dollar value \$ _____
- b. structure _____ sq. ft.; dollar value \$ _____
- c. machinery; dollar value \$ _____
- d. give lease/rental rate and size of any other related facility not included in above listing _____ describe _____
- e. other comments _____

14. Is an expansion of this establishment planned within the next year?

- a. no, check for missing answers, thank respondent
- b. yes, please explain:
 1. land required
 - a. already included in present site.
 - b. _____ acres will be required, estimated dollar value \$ _____
 2. structure required
 - a. already included in present structure
 - b. _____ sq. ft. new space will be required at \$ _____ estimated value
 3. machinery \$ _____ value will be brought in or bought.
 4. _____ additional, permanent, full time jobs will be created by this expansion, adding \$ _____ in estimated annual payroll.
 5. What is the source of funds for this expansion?
 - a. _____
 - b. _____
 - c. _____
 6. **When** is the expansion scheduled to be operational? _____ Date

Thank you for taking time to help complete this interview! This information, together with personnel information supplied, will help evaluate the effectiveness of the growth center strategy of economic development, and thus better insure efficient use of public funds.

4/17/76

DESCRIPTION OF JOB CATEGORIES

Management -- Occupations requiring administrative personnel who set policies, exercise overall responsibility for execution of these policies, and direct individual departments or special phases of a firm's operations. Includes: officials, executives, middle management, plant managers, department managers, and superintendents, salaried foremen who are members of management, purchasing agents, and buyers, and kindred workers.

Professional -- Occupations requiring either college graduation or experience of such kind and amount as to provide a comparable background. Includes: accountants and auditors, airplane pilots and navigators, architects, artists, chemists, designers, dietitians, editors, engineers, lawyers, librarians, mathematicians, natural scientists, personnel and labor relations workers, physical scientists, physicians, social scientists, teachers, and kindred types.

Sales -- Occupations engaging wholly or primarily in direct selling. Includes: advertising agents and salesmen, insurance agents and brokers, real estate agents and brokers, stock and bond salesmen, demonstrators, salesmen and sales clerks, and kindred types.

Clerical -- Includes all clerical-type work regardless of level of difficulty, where the activities are predominantly nonmanual, even though some manual work not directly involved with altering or transporting the products is included. Includes: bookkeepers, cashiers, collectors (bills and accounts), messengers and office boys, office machine operators, shipping and receiving clerks, stenographers, typists and secretaries, telegraph and telephone operators, and kindred types.

Craftsmen/Technicians -- Workers of a relatively high skill having a thorough and comprehensive knowledge of the processes involved in their work, perhaps even a basic scientific knowledge of the processes, that can be obtained through about two years of post high school education. Includes: draftsmen, engineering aids, junior engineers, mathematical aids, nurses, photographers, radio operators, scientific assistants, surveyors, technical illustrators, all types of technicians, building tradesmen, foremen and leadmen (not members of management), mechanics and repairmen, skilled machinists, tool and die makers, compositors and typesetters, electricians, and kindred types.

Operatives/Laborers -- Workers who operate machines or processing equipment or perform other factory type duties of intermediate skill level which can be mastered in a few weeks with limited training, and workers in manual occupations which generally require no special training.

Service -- Workers in service occupations. Includes: attendants (hospital, professional and personal), barbers, charwomen professional cooks, elevator operators, firemen, guards, watchmen, policemen, waiters, waitresses, and kindred types.

APPENDIX C

ACCURACY OF THE DATA

Sources of Error

Total error in this survey may be considered comprised of sampling error and nonsampling error. Sampling error is caused by differences between sample values of a variate and their population value. An assessment of sampling error follows the discussion of nonsampling error.

Nonsampling error is used here to denote error introduced into the survey by interviewing, recording, coding, key punching, and processing survey responses. Since treatment of nonresponse error is somewhat subjective, it will be considered first.

One form of nonresponse error results when the respondents selected from payroll listings are absent at interview time. Six of the 127 respondents (4.7%) are replacements for those originally selected. However, the six replacements represent three of the nine firms sampled and were selected at random from among the unsampled having the same job category and sex as those originally sampled. Because these replacements were due to absence, rather than failure to respond, and because the absences were distributed evenly among three firms, rather than being concentrated in one, the replacement process is assumed not to have biased the sample. One individual declined to be interviewed (0.7%), and was replaced as if he had been absent. Another individual refused to divulge family income information, although the balance of the questions were answered. Thus, this individual was excluded from computations representing family income. Moreover, during editing it was ascertained that five other individuals were in high school at the time they held their previous job. Since these respondents were part of a family during the previous period, yet at interview time were on their

own or even married, it was decided that their previous poverty status could not be fairly determined. They, too, were eliminated from tabulations representing family income aggregates. The 918 determined jobs is thus smaller than the 961 total jobs (see Table XXXIII and XXXIV) because 6 of the 127 respondents were eliminated from family income tabulations. It may be seen (in Tables XXXIII and XXXIV) that 918 jobs are listed as "determined" jobs and 961 as "total" jobs. The 961 represents the population of jobs at the 9 firms allowing their employees to participate in the survey. However, present and previous family income status was determinable for only 121 of the 127 samples cases. The 121, after weighting represent 95.5 percent of the population, or 918 jobs. Since the term "determined" jobs is used and similarly computed by John A. Kuehn (32), computations between this study and his are rendered more comparable.

Several speculative comments regarding the quality of answers provided by respondents have been made in the body of this study. One technique for assessing the representativeness of the sample is to treat data from a recent census as representative of the population and then compare various statistics from the survey sample with the census data. This technique is not particularly applicable to this study for at least two reasons: the latest census is over seven years old, requiring extrapolation of census data by techniques also likely to introduce error; and, more importantly, the sample was not designed to represent the general population. The sample is designed to represent the population of employees holding jobs at firms built by EDA funds or on public works projects funded by the EDA. Moreover, the population is further narrowed to represent projects funded in towns where employers allowed

their employees to participate in the survey. Use of the sample results to assess the effects of Uniroyal employees, for example, is invalid because no information is included on Uniroyal, for reasons explained in the text. Additionally, it is assumed that respondents gave truthful answers. Potential error introduced by interviewing will be considered next.

Only two persons conducted all interviews: the principal researcher and one assistant. Moreover, the principal researcher was at the same location as the assistant whenever employee interviews were conducted by the assistant. Therefore, answers to the assistant's questions on matters of interpretation were answered "on the spot." Every afternoon the day's responses were completely reviewed: the principal researcher reviewed the responses obtained by the assistant, and vice versa. This procedure should insure that interviews were conducted in a manner consistent with the Employee Questionnaire Interview Instructions (Appendix A). The principal researcher was the only person conducting the Funded Project interviews. Thus, the problem of achieving consistency between interviews was eliminated, for all practical purposes, for the Employee Questionnaire and was nonexistent for the Funded Project Questionnaire. Consider mechanical errors next.

All employee surveys were coded on keypunch creation sheets. Coding was then checked by another person. The punched deck was visually verified with the creation sheets. The raw data decks were then subjected to the OSIRIS (Organized Set of Integrated Routines for Investigations with Statistics) computer analysis system data editing and file building subroutines. These routines insure that nonnumeric data is flagged as erroneous and that the input decks are correctly sequenced.

The ultimate result is a dataset on magnetic tape, edited, and ready for analysis.

Three more steps are, however, part of those designed to eliminate data errors and inconsistencies. First, after the edited tape was constructed, the entire set of data was printed out in an easy-to-read format. Each variable for every case was then scanned for senseless magnitudes and codes. Second, control cards for tabular analysis are prepared so that every case can be accounted for, at least in total. Third, control cards are also prepared so that an "other" category is available. When a computer analysis shows the presence of cases in the "other" category, when in fact there should be none, the raw data list is consulted for those variables and cases involved. After correction of such problems, all analysis involving the error or inconsistency is rerun. Thus, data has not been assumed error free, nor has it been so found. However, it is believed that sufficient steps have been incorporated to insure that nonsampling error introduced by coding, keypunching, processing, and programming has been eliminated in the final product. Sampling error will be considered next.

Estimate of Means, Proportions, and Sampling Error

It is desired to estimate values of population means and proportions based on the stratified random sample drawn from the population. Although stratified sampling was used in order to reduce the variability of the sample estimates, sampling error is nevertheless still introduced. The unit of measure of sampling error used herein is the standard deviation, which, like means and proportions, must be estimated from the

sample observations. However, since stratified sampling was used, weighted calculations are needed for all estimates because weighting can compensate for the disproportionate samples drawn from the various strata. Survey Sampling by Leslie Kish (New York: John Wiley and Sons, 1965) is the sampling text referenced in the following discussion, unless otherwise stated. For continuous variables (such as income, and commuting distance), the sample estimate of a population means is obtained by calculating:

$$\bar{y}_w = \sum W_h \bar{y}_h$$

where \bar{y}_w is the mean obtained by summing strata means (\bar{y}_h) weighted by $W_h = N_h/N$. N_h is the size of the population of the h^{th} strata, and N is total population size. Similarly, the population estimate of a proportion may be obtained by substituting p_h for \bar{y}_h , where p_h is the proportion of the sample for the h^{th} strata possessing the attribute of interest. Such calculations are readily performed by the OSIRIS system, which was used to calculate the means and proportions for Tables XXVII, XXX, XXXI, XXXII, XXXIII, and XXXIV.

Computations of weighted variances of the strata means and proportions are considerably more difficult. First, the variance of the simple random sample of n_h elements in the h^{th} stratum must be obtained. For continuous variables, this is:

$$\text{var} (\bar{y}_h) = (1-f_h) \frac{s_h^2}{n_h};$$

and for proportions, it is;

$$\text{var} (p_h) = (1-f_h) \frac{p_h(1-p_h)}{n_h-1}.$$

These are next combined to obtain the variance of the sample mean

$$\text{var } (\bar{y}_w) = \sum W_h^2 \text{var } (\bar{y}_h);$$

or the variance of the sample proportion;

$$\text{var } (p_w) = \sum W_h^2 \text{var } (p_h).$$

The term $(1-f_h)$ in the above calculations proved particularly vexing. It is a finite population correction factor which ranges from a value near one, when n_h is small (relative to N_h), to a value near zero, when n_h is large (relative to N_h). Most survey studies can afford to ignore this finite population correction factor because their sample sizes are small, relative to the size of the population sampled. Such is not the case, herein, because the population is only about 900 employees to begin with. Moreover, fourteen strata are utilized in this study, which necessitates a different correction factor for each strata. Numerically, finite correction factors in this study range from zero to 0.898. System OSIRIS does not accept separate weights for correction factors, so a computer program was specially written to facilitate the calculations. The tables that follow present estimates of one standard deviation of the sample mean or sample proportion for selected tables in the body of the text. The use of these tables is demonstrated in the following examples.

Assuming the sample means and sample proportions are normally distributed in accordance with the central limit theorem, the percentage of nonmovers who are residents of a GC (Table XXX in conjunction with Table XXXIX) is expected to be between 39.6 and 31.0 percent 68 percent of the time (35.3 percent \pm 1 standard error) and between 43.9 and 26.7 percent about 95 percent of the time (35.3 percent \pm 2 standard errors).

Similarly, the average daily commuting mileage (Table XXXI in conjunction with Table XL) is expected to be between 8.1 and 6.7 miles 68 percent of the time ($7.4 \text{ miles} \pm 1 \text{ standard error}$) and between 9.8 and 6.0 miles about 95 percent of the time ($7.4 \text{ miles} \pm 2 \text{ standard errors}$). Thus, by using the tables of standard errors in conjunction with their corresponding tables in the text, the accuracy of the estimates in the text can be gauged. A discussion of the statistical methodology used for conducting the earning effects test will be considered next.

Earning Effects Test

Each respondent qualifying for inclusion in the earnings effect test contributes two observations: one observation to the average earnings from the present job, and one observation to the average monthly earnings the respondent thinks would be earned if the previous job were still held. Since the data are paired for each qualifying respondent, a paired statistical test is needed. Such a test is outlined in Ostle (51, p. 121) and requires calculating the test statistic:

$$\frac{\bar{D}}{s_{\bar{D}}}$$

In this formulation, \bar{D} is the weighted average difference between earning values within each strata, and $s_{\bar{D}}$ is the standard error of these differences. If the calculated value of this ratio is greater than the tabled value of Student's t for $n-1$ pairs of observations, and the desired level of significance, then the null hypothesis will be rejected in favor of the alternative. Calculation of this test statistic is, however, made considerably more difficult by the fact that a stratified sample was utilized and also by the fact that the $n = 74$ qualifying

respondents is a subclass of the sample of 127 respondents. Kish offers procedures for calculating subclass means and variances for stratified samples. The subclass mean is

$$\bar{y}_w = \sum w_h \bar{y}_h.$$

In this case, \bar{y}_h is the mean difference between the earning variables for strata h . The strata weight is a combination of the population size for each strata, N_h , the sample size for each strata, n_h , and the size of the subclass of each strata sample, m_h . For each strata w_h is obtained by calculating:

$$w_h = \frac{\frac{N_h}{n_h} m_h}{\sum \frac{N_h}{n_h} m_h}.$$

Individual strata mean differences and corresponding strata weights are:

<u>strata</u>	<u>\bar{y}_h</u>	<u>w_h</u>
Male, management	\$533.83	0.1209
Male, professional	163.00	0.0336
Male, sales	326.67	0.0142
Male, clerical	125.00	0.0130
Male, craftsman	134.25	0.2588
Male, operatives	119.76	0.3175
Male, service	-242.00	0.0053
Female, management	344.75	0.0099
Female, clerical	172.50	0.0445
Female, craftsmen	78.50	0.0097
Female, operatives	117.30	0.1727

The weighted subclass mean is obtained by calculating $\sum w_h \bar{y}_h = \$179.87$.

The OSIRIS system computes the variance of the differences for each strata, v_h^2 , which can then be used to compute the variance of the subclass mean which according to Kish is:

$$\text{var}(\bar{y}_w) = \sum \left(1 - \frac{n_h}{N_h}\right) \frac{w_h^2}{m_h} \left[v_h^2 + \left(1 - \frac{m_h}{n_h}\right) \left(\bar{y}_h - \bar{y}_w\right)^2 \right],$$

where $m'_h = m_h (n_h - 1)/n_h$, and the rest of the variables have been previously defined. The square root of the variance (901.34) is $s_{\bar{D}} = 30.02$. The test statistic can now be calculated $\bar{D}/s_{\bar{D}} = 179.87/30.02 \doteq 5.99$. This ratio is so large that it is virtually certain that the positive earnings difference is not due to chance alone.

TABLE XXXIX
 STANDARD ERROR OF PROPORTION FOR THE PERCENTAGE
 DISTRIBUTION OF RESIDENT GC EMPLOYEES
 BY LOCATION OF RESIDENCY AND
 MIGRANT GC EMPLOYEES BY
 FORMER RESIDENCY

Nonmovers Who Are Residents		
Of a GC		4.3
Of a GC county, not GC		3.8
Of a RA county		3.4
Of another SODA county		1.1
Outside SODA		1.5
Movers Making Nonjob-Related Moves		
Total		2.3
Movers Making Job-Related Moves to GC Jobs		
	<u>Returnees</u> <u>Originally Residing</u>	<u>Nonreturnees</u> <u>Originally Residing</u>
Within GC county	0.2	0.8
Within RA county	0.5	1.0
Within another SODA county	NA	0.8
Outside SODA, within Oklahoma	0.6	0.8
Outside SODA, within adjacent states	1.1	0.8
Outside SODA & adjacent states	NA	0.8

Source: Employee Questionnaire Tabulations

Notes: See Table XXX for definitions of headings.

TABLE XL
STANDARD ERROR OF MEANS AND PROPORTIONS
FOR COMMUTING TRENDS

Commuting mileage	0.7 (miles)
Milceage classes	
0-4	4.3 (percent)
5-9	2.5
10 or less	4.1
10-19	3.3
20-29	3.2
30-39	0.8

Source: Employee Questionnaire Tabulations

Notes: See Table XXXI and XXXII for definitions of headings.

TABLE XLI
 STANDARD ERROR OF PROPORTIONS FOR COMPARATIVE
 STATISTICS: EFFECTS OF JOB DEVELOPMENT
 ON POVERTY STATUS

Total previously unemployed	3.8
Total previously poor or unemployed	4.3
Residents previously poor	4.0
Total escaping poverty	4.0
Residents escaping poverty	4.0
Total moving into poverty	1.3
Residents moving into poverty	1.3

Source: Employee Questionnaire Tabulations

Notes: See Table XXXIII for definitions of headings.

TABLE XLII
STANDARD ERROR OF PROPORTION FOR SELECTED
SOCIOECONOMIC CHARACTERISTICS
OF EMPLOYEES

Sex	
Male	0.
Female	0
Race	
White	2.9
Minority	2.9
Educational Level	
No degree	3.5
H.S. Degree	4.4
Some college	3.9
B.S.	1.7
B.S. Plus	0.7
Marital Status	
Now married	3.2
Widowed	0.7
Divorced/Separated	2.6
Never Married	2.3
Previously Unemployed or Underemployed	
GC Resident	3.8
RA Resident	2.0
Previously Unemployed or Underemployed (escaping poverty)	
GC Resident	4.0
RA Resident	2.0

Source: Employee Questionnaire Tabulations.

Notes: See Table XXXIV for definitions of headings.

VITA

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